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The business magazine of the farm & industrial equipment industry

November 1984

FOUR DOLLARS

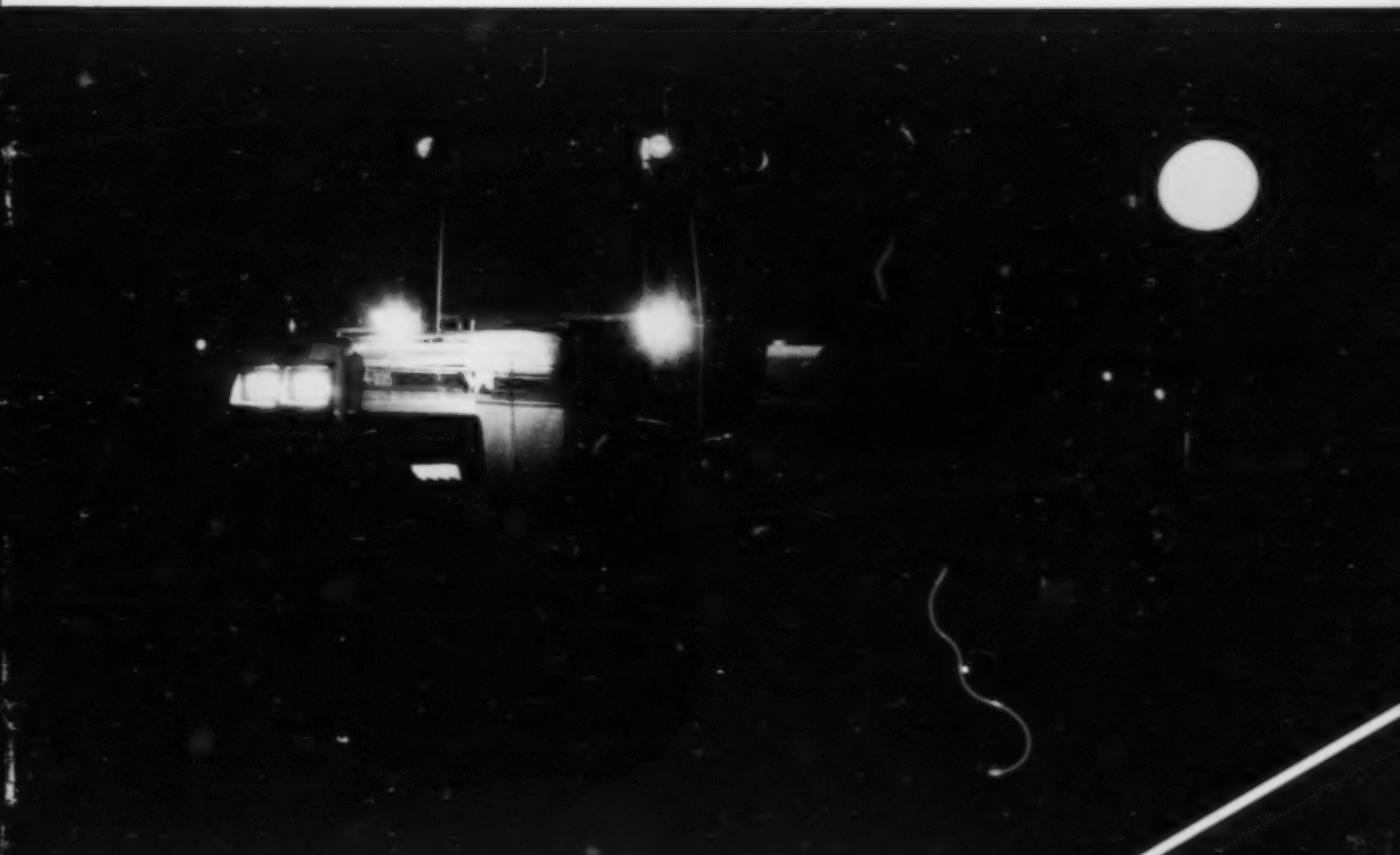
Implement & Tractor

47th Market Statistics Issue

Retail Sales Perspective

Latest Import-Export Data

Equipment on Farms



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Implement & Tractor

The business magazine of the farm and industrial equipment industry

November 1984 • Vol. 99 • No. 13

47th Annual Statistics Issue

22: Introduction

Machines on Farms—1984

24: Motor Vehicles and Specified Machines on Farms, 1961-1984
26: Principal Machines on Farms

Retail Sales

38: Retail Sales of Farm Wheel Tractors by State, 1980-1983
40: Retail Sales of Selected Farm Equipment, 1982-1983

Exports and Imports

42: Wheel Tractor Imports by Horsepower and Country of Origin, 1981, 1982, 1983, Jan.-June 1984.
44: Imports by Value and Country of Origin, 1979, 1980, 1981, 1982, 1983, Jan.-June 1984.
45: Imports of Farm Equipment by Products, 1982, 1983, Jan.-June 1984.
46: Exports of Farm Equipment by Type of Product, 1982, 1983, Jan.-June 1984.
47: Exports of Farm Equipment by Value and Country of Destination, 1982, 1983, Jan.-June 1984.

16: Manufacturers Eye a Challenging Year Ahead. The annual FIEI convention brings out some modest optimism at White Sulphur Springs, W. Va.

20: Dealer Close-Out with a Happy Ending. After nearly 40 years, George Knecht winds down his business on his own terms.

On the cover...photo courtesy of White Farm Equipment Co.

DEPARTMENTS

I&T Update....................4
Editor's Notebook.............6
Auction Prices...............10
What's New...................50
Farm Equipment Patents......61
Brown Pages.................63
Classified Ads..............68
Index to Advertisers........68

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I&T Update

September U.S. Retail Sales: Some Ups, But Mostly Downers

September retail sales of farm tractors in the U.S. were off by 5 per cent, but there were vast variances between horsepower groups. Baler and mower-conditioner volume moved up sharply, countering declines in combine and forage harvester sales. Source: Farm & Industrial Equipment Institute flash report.

Unit Retail Sales

	September			January-September		
	1984	1983	Pct. Change	1984	1983	Pct. Change
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	3,509	3,381	+ 3.8	40,173	37,086	+ 8.3
40-99 hp	2,372	2,902	−18.3	29,404	29,196	+ .7
100-139 hp	681	864	−21.2	7,087	10,682	−33.7
Over 140 hp	1,463	1,072	+36.5	10,419	8,936	+16.6
Total 2-wheel drive	**8,025**	**8,219**	**− 2.4**	**87,083**	**85,900**	**+ 1.4**
4-wheel drive						
Under 200 hp	74	167	−55.7	1,165	1,363	−14.5
Over 200 hp	176	339	−48.1	1,926	2,026	− 4.9
Total 4-wheel drive	**250**	**506**	**−50.6**	**3,091**	**3,389**	**− 8.8**
Total All Tractors	**8,275**	**8,725**	**− 5.2**	**90,174**	**89,289**	**+ 1.0**
S-P Combines	1,391	1,486	− 6.4	6,566	8,177	−19.7
Balers (under 200-lb. bales)	674	537	+25.5	7,378	8,312	−11.2
Forage Harvesters (shear-bar type)	571	696	−18.0	2,380	3,094	−23.1
Mower-Conditioners	1,049	714	+46.9	11,514	12,954	−11.1

1983 Shipments Data Just In!

Arrived too late for inclusion in I&T's 47th Market Statistics Issue: Data on shipments by U.S. manufacturers of wheel tractors, farm equipment and lawn and garden equipment. More details will appear in a later issue. Here are some highlights:

- Shipments of farm- and nonfarm wheel tractors, their attachments and parts declined to $2.020 billion in 1983 from $2.567 billion in 1982.
- Shipments of farm equipment other than tractors declined to $4.472 billion in 1983 from $5.535 billion in 1982.
- Shipments of lawn and garden equipment increased from $2.486 billion in 1982 to $2.665 billion in 1983.

Here are shipment values on major groups of farm equipment including parts for 1983 with comparable 1982 data in parentheses:

Planting, seeding and fertilizing machinery—$449 million ($673 million).

Harrows, rollers, pulverizers, stalk cutters—$342 million ($361 million).

Plows—$128 million ($151 million).

Harvesting machinery—$1.478 billion ($2.07 billion).

Haying machinery—$525 million ($545 million).

Dairy equipment—$118 million ($111 million).

Sprayers, dusters—$229 million ($258 million).

Elevators, blowers—$73 million ($112 million).

Cultivators, weeders—$136 million ($202 million).

Crop preparation equipment—$186 million ($282 million).

Poultry equipment—$104 million ($110 million). Hog equipment—$50 million ($42 million).

Other barn/barnyard equipment—$183 million ($202 million). Wagons, other farm transport equipment—$153 million ($173 million).

Irrigation systems—$317 million ($241 million).

Canadian September: Sales Mostly Weak

The Canadian Farm & Industrial Equipment Institute flash report for September tells a story like the one of the U.S. Tractor sales for the month of September were off 16 per cent at 1,283. But for the year, tractor volume is a 7 per cent plus at 13,380 units. The strength has been in under-40-hp units (up 25 per cent at 2,779), 40-99 hp units (up 18 per cent at 5,797) and four-wheelers (up 13 per cent at 1,775).

Self-propelled combines, down 40 per cent for September at 376 units, are off 15 per cent for the year at 1,643. Big balers are off 20 per cent for the year at 1,675; small balers are off 4 per cent at 1,644. Mower-conditioners are down 11 per cent for the year at 1,992 units.

Markets Down In France, Too

In France, wheel tractor sales for the first half of 1984 were down 6 per cent at 18,302 units, according to SYGMA, the association of French equipment makers. Domestic sales came to 9,694 units, off 4 per cent. Export sales of 8,608 were off 8 per cent.

Combine sales were off 25 per cent at 841 units. Sales of rectangular balers were up 4 per cent at 8,907; big baler sales volume was also up—to 7,298 units, a 9 per cent rise.

ROPS Now Standard On All Deere Tractors

As part of a two-phase effort to enhance farm tractor operator safety, Deere & Co. is now shipping all farm tractors from the 14-hp 650 to the 120-hp 4250 with ROPS protection. On larger tractors, ROPS protection has been standard for over 10 years.

Moglia Succeeds Merv Manning at Ford Tractor

Robert F. Moglia, who had been Ford Tractor Operations' assistant general manager for product development, manufacturing and supply, is new general manager of FTO. He succeeds Mervyn H. Manning, who has been named president of Ford Asia-Pacific, Inc., and will be based in Melbourne, Australia.

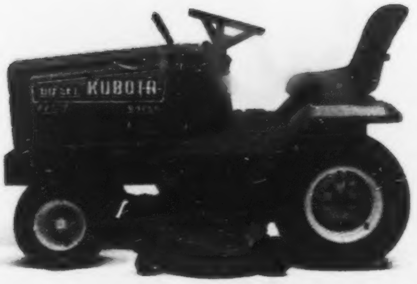
Moglia joined Ford in 1960 as a senior product design engineer at FTO. He became FTO's product planning manager in 1973 and assistant general manager of product development in 1977.

Manning, who had headed FTO since 1977, recently completed a term as chairman of the Farm & Industrial Equipment Institute.

Hesston's First Nine Months: $145 Million

Hesston Corp. has reported sales in the first nine months of 1984 of $145.5 million compared with $155.5 million in the same 1983 period. The company lost $1.77 million in the first nine months of 1984 compared with 1983 earnings of $4.69 million.

The third quarter this year produced a loss of $4.5 million on sales of $40 million; last year, the third quarter posted sales of $54 million and a profit of $2.67 million.



G4200H, 12 hp diesel engine.

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And we don't just put our name on a tractor, we build the tractor from the ground up.

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

YODER & FREY, INC.
Archbold, Ohio
September 11, 1984

INTERNATIONAL HARVESTER TRACTORS

A,	525
Cub, 1950 (Fair)	875
C, 1951 (Fair)	800
C, 1952 (Rough)	800*
H, 1952 (Rough)	500*
H, 1949 (Rough)	550*
H, 1944 (Rough)	375
H, 1945 (Rough)	285*
H, 1944 (Rough)	250
M, 1950 (Fair)	700*
M, 1949 (Fair)	550*
M, 1949 (Rough)	350
M, 1950 (Rough)	600*
M, 1948 (Fair)	850
Sup. M, 1952 (Rough)	650*
Sup. M, 1953 (Rough)	200
140, 1961 (Rough)	1850
300, 1957 (Rough)	900*
300, 1956 (Fair)	525
400, 1957 (Rough)	775*
460, (Fair)	700*
460, 1958 (Good)	1425
560, 1960 (Good)	2100
560, 1959 (Rough)	1700
574, 1974 (Fair)	4200
666, 1974 (Fair)	3300*
706, 1965 (Fair)	2900*
756, 1971 (Good)	7000*
766, 1974 (Fair)	7100
806, 1964 (Rough)	1900*
806, 1967 (Fair)	4750
806, 1972 (Fair)	4750*
826 diesel, 1970 (Rough)	5750*
856 diesel, 1968 (Good)	5200*
856, 1970 (Good)	7200*
966, 1975 (Fair)	6500
966 diesel, 1972 (Good)	8100*
966 diesel, 1972 (Good)	7250
966 diesel, 1975 (Good)	8100
966, 1974 (Fair)	7100
986, 1978 (Good)	11,400*
986, 1977 (Good)	12,250
1026 hydro, 1970 (Fair)	5400
1066, 1972 (Fair)	6500*
1066 diesel, 1974 (Good)	6900
1066 diesel, 1974 (Good)	7000*
1066 diesel, 1975 (Fair)	6000*
1066, 1972 (Fair)	7700
1066, 1976 (Fair)	2250*
1066, 1975 (Fair)	8750
1206, 1965 (Fair)	4500*
1466, 1974 (Good)	6650*
4586, 1978 (Good)	13,500*

WHITE TRACTOR

2-135 diesel, 1978 (Fair)	13,000*

JOHN DEERE TRACTORS

A, 1950 (Fair)	625
B, 1946 (Fair)	475*
B, 1945 (Fair)	500*
60, 1955 (Fair)	750
60, 1955 (Fair)	825
420, 1956 (Fair)	1600*
MT, 1950 (Fair)	675
MT, 1949 (Fair)	490
G, 1949 (Fair)	450*
40, 1950 (Rough)	650
50, 1955 (Fair)	980
720 diesel, 1957 (Fair)	800*
720, 1957 (Fair)	2000*
730 diesel, 1960 (Fair)	2450*
730 diesel, 1958 (Rough)	1050*
730, 1958 (Fair)	1775*
1020, 1970 (Good)	3700*
2010, 1962 (Rough)	2300*
2010, 1962 (Fair)	1750*
3010 diesel, 1963 (Fair)	3600*
3010, 1966 (Good)	3500
3010, 1962 (Fair)	2275
3010 diesel, 1963 (Rough)	2250
3020, 1969 (Fair)	5500
4010 diesel, 1963 (Fair)	4250
4010 diesel, 1967 (Fair)	4100*
4010, 1967 (Fair)	2600*
4020, 1966 (Rough)	4900*
4020 diesel, 1967 (Fair)	5400*
4020 diesel, 1968 (Fair)	5700*
4020 diesel, 1965 (Rough)	3000
4020, 1965 (Fair)	4800*
4020, 1965 (Good)	6200*
4020, 1965 (Fair)	4900*
4030, 1975 (Fair)	8300*
4230, 1975 (Fair)	8750*
4320, 1972 (Fair)	7500*
4430, 1974 (Fair)	10,750*
4630, 1975 (Good)	14,500*
5020, 1968 (Fair)	4250*

COCKSHUTT TRACTOR

20, 1945 (Fair)	675

OLIVER TRACTORS

1365,	2275
1550, 1967 (Good)	4650
1800 diesel, 1963 (Fair)	2300*
1800, 1962 (Rough)	1500*
1850 diesel, 1965 (Fair)	2900*
1850 diesel, 1966 (Fair)	3750
1850, 1966 (Rough)	1500*
1950, 1967 (Fair)	4800*
2150 diesel, 1968 (Fair)	4000*

KUBOTA
M8950DT

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M8950, 85 PTO hp diesel engine.

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Write In (8) on Reply Card

FORD TRACTORS

8N, (Fair)	1075
8N, 1947 (Fair)	1300*
8N, 1948 (Fair)	1200*
9N, 1942 (Rough)	875
9N, 1943 (Rough)	700*
800, 1955 (Rough)	2450
960, 1957 (Fair)	1200
801, 1955 (Rough)	1200*
901, 1957 (Fair)	1225*
4000, 1963 (Fair)	1200*
4000, 1967 (Fair)	2500*
5000, 1974 (Fair)	4500*
8000, 1972 (Fair)	3700*
8000, 1972 (Fair)	4500*
9000, 1971 (Fair)	5100
7700, 1978 (Good)	8750*
3000 diesel, 1965 (Rough)	1700*
3000, 1971 (Fair)	4500*
971, 1956 (Rough)	1000*
971 diesel, 1955 (Rough)	750*
4200, 1969 (Rough)	2000*
Jub., 1953 (Rough)	1800*
9700, 1977 (Good)	12,000*

FERGUSON & MASSEY FERGUSON

TO-20, 1947 (Fair)	900
TO-30, 1949 (Fair)	1225
TO-30, 1950 (Rough)	1260
TO-30, 1951 (Rough)	1300*
35, 1959 (Rough)	2000*
65, 1960 (Fair)	1050
85 diesel, 1959 (Rough)	1000
90, 1962 (Fair)	1400*
165, 1970 (Rough)	2800*
180, 1965 (Fair)	1900
180, 1965 (Fair)	3000
1100, 1967 (Rough)	2200
1100, 1968 (Fair)	3000*
1100, 1969 (Rough)	2800*
1135 diesel, 1974 (Fair)	6000*
1155 diesel, 1976 (Fair)	5300*

ALLIS-CHALMERS TRACTORS

WD, 1950 (Fair)	700
WD, 1945 (Rough)	550
D-15, 1966 (Fair)	1500*
190XT, 1969 (Fair)	2000
190XT diesel, 1969 (Fair)	1400*
190XT, 1965 (Fair)	3050
5040,	3800

CASE TRACTORS

1212 DB, 1973 (Fair)	3250*
990 ldr., 1964 (Rough)	1100*
530 ldr., 1966 (Rough)	2400*
770, (Fair)	2950
830 diesel,	525
830 diesel, 1967 (Fair)	1600*
930, 1965 (Good)	1900*
930, 1965 (Fair)	3000*
1030 diesel, 1967 (Good)	3600*
1030 diesel, 1964 (Good)	3250*
1030 diesel, 1967 (Good)	3600*
1070, 1972 (Fair)	3000*
1070 diesel, 1972 (Fair)	6000*
1070, 1971 (Rough)	3550
1070, 1970 (Fair)	4750

MASSEY-HARRIS TRACTOR

44, 1950 (Fair)	520

MINNEAPOLIS-MOLINE TRACTOR

G-955 diesel, 1968 (Fair)	4250*

DEUTZ TRACTORS

D10006, (Good)	2700*
D10006, (Rough)	2600*
D13006, (Fair)	5750
50-60, (Rough)	4000*

ENLOW AUCTION CO.
Tulsa, Okla.
September 22, 1984

ALLIS-CHALMERS TRACTORS

D-15, plow, 1962 (Fair)	1250*
D-17 diesel, ldr., 1963 (Good)	2450*

CASE TRACTORS

430, 1961 (Good)	2250*
530, ldr., 1969 (Fair)	2050
930 diesel, 1966 (Good)	3475
850-C diesel dozer, 1981 (Good)	15,500*

DAVID BROWN TRACTOR

885 diesel, 1973 (Good)	3250

FERGUSON TRACTORS

20, 1950 (Good)	1200
30, 1952 (Rough)	750
40, 1956 (Fair)	1250

FORD TRACTORS

9N, 1943 (Good)	900
9N, 1944 (Good)	1250
9N, 1945 (Good)	1275
9N, 1945 (Good)	950
9N, 1946 (Fair)	775
9N, 1946 (Fair)	850
9N, 1947 (Fair)	875
8N, 1948 (Good)	1250
8N, 1948 (Fair)	975*
8N, trencher, 1949 (Good)	1275
8N, 1950 (Good)	1350
8N, 1950 (Good)	1400
8N, 1951 (Good)	1500*
8N, 1952 (Good)	1600*
8N, 1952 (Fair)	1100
NAA, 1953 (Good)	1950*
NAA, 1953 (Rough)	1110
650, 1956 (Good)	1950
650, 1956 (Good)	2450
650, ldr., 1957 (Good)	2500*
800, 1955 (Good)	2100
850, 1955 (Good)	2500
841 LP, 1958 (Fair)	1050*
900 Select-O-Speed, 1954 (Good)	1850
900, mo., 1955 (Fair)	1200*
Dexta diesel, 1961 (Fair)	1350
2000 diesel, 1965 (Fair)	2000
2000 diesel, mo., 1969 (Good)	2950
2000 diesel, 1970 (Good)	3050
2000, 1972 (Good)	3500*
2000, 1973 (Good)	3850
3000 diesel, 1969 (Good)	2900*
3000 diesel, 1975 (Good)	3650*
4000, backhoe, 1964 (Fair)	3000
4000 diesel, 1970 (Good)	3250
4000 diesel, 1970 (Good)	3400*
4000 diesel, 1972 (Good)	3600*
4000 diesel, 1974 (Good)	3850
4110, Select-O-Speed, 1969 (Good)	2500*
4110, 1969 (Fair)	1700*
3400 diesel, ldr., 1970 (Excellent)	6250
5000 diesel, 1969 (Good)	4000*
5000 diesel, 1970 (Good)	4400
5000 diesel, 1972 (Good)	5200
8000 diesel, 1970 (Fair)	4950*

INTERNATIONAL HARVESTER TRACTORS

Cub, mo., 1958 (Good)	1575*
284, 1977 (Good)	2750
384 diesel, 1979 (Fair)	[illegible]*
414, 1964 (Fair)	1200*

(Continued on page 58)

THE DIESEL PROTECTORS

Dahl removes virtually 100% of the water and solid contaminants from diesel fuel. Factory filters cannot keep the fuel clean. Dirty diesel fuel lessens performance and service life of diesel engines.

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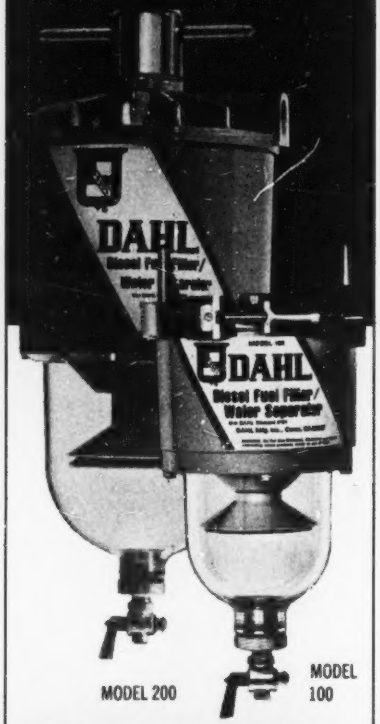
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Here's our

I&T 47 TH MARKET STATISTICS ISSUE

■BACK IN the dawn of the computer age, the editors of I&T thought that this new technology was going to make the gathering and presenting of statistical data a piece of cake. October, we reasoned, was going to be our gone-fishin' month because all that information would be handled by a push of a button. Data would be on hand, ready for the printer's crafts, well in advance, and so forth.

But it hasn't worked out that way. Farm census data can take about as long to arrive as 20 years ago. Manufacturers' shipments numbers take longer than they did in the past. it may be because the computer people try to do more with what they have, and so it takes longer, but whatever the reason, many of the numbers I&T hoped to have for its 47th statistical issue didn't make it in time.

You'll see, in our Equipment on Farms section, 1978 census data beside our July 1 estimates; we had hoped for information from the 1982 census. It will probably get here any day, but not in time for our deadline. And information on Manufacturers' Shipments will have to appear in a later issue of I&T, for the Dept. of Commerce hadn't sent it out as of late October.

But there's good news! Besides I&T's estimates of equipment on farms by state as of July 1, 1984, our export and import numbers are up to date, through June 30, 1984, with several years' perspective concerning specific products, values and their countries of destination or origin. There is also perspective on tractor retail sales over several years.

Points to note. Take a look at Tractors on Farms, page 26. The bottom line over a 25-year span reflects very little change in total number, and much of that has been caused by definition changes about what constitutes a farm, combined with refined information gathering by the Bureau of the Census.

It suggests to us that since there are far fewer workers on U.S. farms, the tractors that are there have to get far fewer hours of use each year.

The moldboard plow total for 1984 isn't much different from that of 1958, but look at some of the differences in individual states. Knowing what we know about changed tillage practices and changed equipment, the numbers suggest to us that there are vast quantities of unused moldboards in field corners and behind barns across the nation.

Farm equipment imports had been going down for several years, but they increased in 1983 and again in the first half of 1984. Similarly, exports had been going down, but they started up again in the first half of this year. The U.S. still has a favorable trade balance in tractors and farm equipment.

Most I&T subscribers, our researchers tell us, hang on to their I&T Market Statistics issues about as long as they keep their Red Books and Product Files. If you're one of the keepers, we suggest that you watch upcoming I&T issues for more key industry data and tuck them in with this one. I&T

Motor Vehicles and Specified Machines on U.S. Farms and Average Prices of Wheel Tractors, January 1, Designated Years[1]

Year	Tractors (wheel & crawler) Thousands	Motor Trucks Thousands	Grain Combines Thousands	Corn Pickers & Shellers Thousands	Pick-up Balers Thousands	Forage Harvesters Thousands	Garden Tractors & Tillers[2] Thousands	Wheel Tractors Wholesale Prices[3] Per Unit Dollars	Wheel Tractors Wholesale Prices[3] Horsepower Dollars
1961	4,743	2,850	980	740	685	291	468	$ 2,578	$ 50
1962	4,763	2,885	960	730	703	300	485	$ 2,819	$ 51
1963	4,778	2,925	940	720	718	307	500	$ 3,046	$ 53
1964	4,786	2,970	920	705	734	312	513	$ 3,443	$ 53
1965	4,787	3,030	910	690	751	316	699	$ 3,541	$ 56
1966	4,783	3,017	888	686	752	316	725	$ 3,886	$ 58
1967	4,786	3,009	867	680	748	319	750	$ 4,257	$ 62
1968	4,766	3,016	847	673	739	321	770	$ 4,709	$ 66
1969	4,712	3,004	820	657	725	314	790	$ 4,976	$ 71
1970	4,619	2,978	790	635	708	304	805	$ 5,560	$ 76
1971	4,562	2,985	760	629	698	309	815	$ 6,190	$ 80
1972	4,509	2,993	725	625	687	315	825	$ 6,486	$ 84
1973	4,477	3,006	703	618	680	324	835	$ 6,953	$ 85
1974	4,478	3,020	685	618	677	332	850	$ 7,294	$ 86
1975	4,463	3,032	666	615	666	337	870	$ 8,459	$ 91
1976	4,434	3,043	647	610	642	342	890	$11,220	$112
1977	4,381	3,052	630	605	614	346	905	$12,692	$124
1978	4,350	3,054	615	600	595	345	917	$13,431	$144
1979	4,990	3,555	664	694	769	376	1,060	$16,512	$149
1980	4,960	3,566	677	690	761	381	1,075	$18,139	$166
1981	4,925	3,577	690	685	752	386	1,085	$23,308	$199
1982	4,855	3,585	698	680	742	388	1,090	$25,941	$204
1983	4,815	3,594	703	674	732	390	1,090	$33,647	$234
1984	4,785	3,600	705	667	720	388	1,087	$35,590	$245

[1] SOURCE: Reports of the USDA and the Bureau of the Census. On-farm data after 1970, except 1975 and 1979, are estimated by I&T.

[2] Motor Tillers included after 1964.

[3] Estimated at wholesale level by dividing **Value of Manufacturers' Shipments** by **Units Shipped** and by **Maximum Belt Horsepower**, data are published in "Current Industrial Reports" of the Bureau of the Census.

Note: Data from the 1978 Census (Jan. 1, 1979 above) and later years, reflect changes in data collection, resulting in improved coverage by the Census and are not fully comparable with earlier years.

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Principal Machines on Farms – 1984

STATE	WHEEL AND CRAWLER TRACTORS						TRACTOR MOLDBOARD PLOWS	
	1959 Census Number	1964 Census Number	1969 Census Number	1974 Census Number	1978[1] Census Number	Estimated July 1, 1984 Number	Estimated July 1, 1958 Number	Estimated July 1, 1984 Number
Maine	17,793	16,290	14,252	13,493	15,064	15,360	12,400	8,900
New Hampshire	6,605	6,253	4,953	4,989	5,584	6,400	4,600	2,880
Vermont	16,669	16,333	15,227	14,706	16,322	16,100	10,200	9,660
Massachusetts	12,068	11,575	9,537	9,341	10,902	11,600	8,800	5,980
Rhode Island	1,651	1,687	1,359	1,359	1,684	1,740	1,000	830
Connecticut	11,219	9,963	8,679	7,924	9,169	9,400	7,700	5,500
New York	138,670	136,304	122,645	118,313	128,248	127,000	107,000	78,800
New Jersey	24,726	22,042	19,984	19,324	22,991	22,800	21,500	17,100
Pennsylvania	144,759	144,149	126,810	124,251	142,844	143,700	118,600	97,800
Delaware	8,259	7,992	7,555	7,631	8,720	8,650	6,700	6,480
Maryland	37,291	37,203	34,174	34,705	40,699	41,100	30,500	28,370
NORTHEAST	**419,710**	**409,791**	**365,175**	**356,036**	**402,227**	**403,850**	**329,000**	**262,300**
Ohio	204,681	199,694	194,962	188,580	205,972	197,000	161,000	159,900
Indiana	186,853	181,086	174,055	167,382	183,002	175,500	149,000	142,300
Illinois	290,002	287,480	275,203	272,093	285,773	277,200	210,000	183,000
Iowa	327,863	329,172	318,998	317,052	328,292	314,000	235,000	215,500
Missouri	191,512	198,095	201,513	189,672	205,572	195,500	135,000	148,600
CORN BELT	**1,200,911**	**1,195,527**	**1,164,731**	**1,134,779**	**1,208,611**	**1,159,200**	**890,000**	**849,300**
Michigan	169,782	169,920	152,741	143,569	157,697	148,300	139,000	129,000
Wisconsin	234,387	247,427	229,752	237,457	258,119	251,000	171,000	164,700
Minnesota	275,833	284,887	258,614	260,535	282,533	273,000	210,000	182,100
LAKE STATES	**680,002**	**702,234**	**641,107**	**641,561**	**698,349**	**672,300**	**520,000**	**475,800**
North Dakota	121,039	122,056	118,069	123,072	121,966	119,200	84,000	69,100
South Dakota	115,639	120,100	111,532	114,456	112,782	107,500	84,000	67,900
Nebraska	175,254	180,423	166,098	170,423	177,691	175,800	108,000	96,700
Kansas	173,651	174,185	163,180	161,276	160,479	156,000	123,000	96,500
GREAT PLAINS	**585,764**	**596,764**	**558,879**	**569,317**	**572,918**	**558,500**	**399,000**	**330,200**
West Virginia	21,995	23,926	23,842	23,265	27,951	27,500	15,400	17,900
Kentucky	103,415	118,404	137,105	129,069	164,862	158,500	71,000	103,000
Tennessee	97,800	108,319	122,528	110,941	130,031	124,500	43,000	65,700
Virginia	75,143	78,989	79,347	76,121	90,284	88,400	52,000	62,600
North Carolina	140,639	149,850	150,825	130,140	152,917	141,600	57,600	72,200
APPALACHIAN	**438,992**	**479,488**	**513,647**	**469,536**	**566,045**	**540,500**	**239,000**	**321,400**
South Carolina	48,637	50,931	50,115	45,321	53,627	51,370	9,200	13,350
Georgia	89,392	89,049	84,366	77,067	85,049	84,700	23,500	34,400
Florida	35,820	41,295	42,958	44,192	57,226	63,000	12,300	20,800
Alabama	67,559	71,925	75,069	68,521	75,398	72,900	20,500	25,300
SOUTHEAST	**241,408**	**253,200**	**252,508**	**235,101**	**271,300**	**271,970**	**65,500**	**93,850**
Mississippi	84,425	90,347	88,677	76,808	80,964	77,700	29,700	32,600
Louisiana	53,229	60,618	63,194	55,933	64,337	65,500	15,400	23,500
Arkansas	83,852	90,993	86,977	78,083	89,421	89,000	41,900	51,000
DELTA STATES	**221,506**	**241,958**	**238,848**	**210,824**	**234,722**	**232,200**	**87,000**	**107,100**
Oklahoma	102,323	101,605	102,397	91,661	105,795	101,000	74,000	81,800
Texas	268,233	269,519	282,088	251,687	280,102	279,000	74,500	91,900
SOUTHERN PLAINS	**370,556**	**371,124**	**384,485**	**343,348**	**385,897**	**380,000**	**148,500**	**173,700**
Montana	59,510	61,832	58,729	58,457	55,941	57,600	30,500	27,700
Idaho	56,961	58,607	54,091	55,419	55,392	59,200	40,000	36,900
Wyoming	20,737	21,596	20,925	20,801	19,756	19,500	15,400	14,400
Colorado	64,051	63,906	59,112	58,091	59,959	60,200	34,000	28,300
New Mexico	17,146	17,919	15,998	17,021	17,546	17,950	11,300	8,600
Arizona	13,443	13,747	12,136	13,812	12,749	14,750	4,200	3,500
Utah	21,803	22,256	20,128	21,110	22,206	23,400	17,500	15,400
Nevada	5,297	5,557	5,318	5,515	5,453	5,680	3,100	2,650
MOUNTAIN STATES	**258,948**	**265,420**	**246,437**	**250,226**	**249,002**	**258,280**	**156,000**	**137,450**
Washington	63,114	65,813	58,600	59,542	58,190	67,800	42,000	40,300
Oregon	56,732	58,741	51,223	52,651	52,283	59,000	44,000	37,800
California	147,390	142,812	138,914	140,393	136,256	165,400	70,000	67,800
PACIFIC	**267,236**	**267,366**	**248,737**	**252,586**	**246,729**	**292,200**	**156,000**	**145,900**
TOTAL	**4,684,852**	**4,782,872**	**4,614,554**	**4,463,314**	**4,835,800**	**4,769,000**	**2,990,000**	**2,897,000**

[1] Only wheel tractors are included in the 1978 Census.

Principal Machines on Farms – 1984

	COMBINES[1]					CORN HEADS FOR COMBINES[2]			
STATE	1964 Census Number	1969 Census Number	1974 Census Number	1978 Census Number	Estimated July 1, 1984 Number	1969 Census Number	1974 Census Number	1978 Census Number	Estimated July 1, 1984 Number
Maine	875	218	242	415	410	120	141	192	190
New Hampshire	27	8	5	18	15	65	55	64	55
Vermont	344	113	87	170	150	175	238	375	400
Massachusetts	70	34	35	47	40	84	103	113	115
Rhode Island	20	5	7	15	15	21	10	23	20
Connecticut	77	40	15	86	65	92	85	157	150
New York	16,536	4,902	5,114	5,994	6,070	1,706	2,344	3,576	4,070
New Jersey	1,726	634	766	1,226	1,240	269	324	671	680
Pennsylvania	23,939	6,777	7,297	9,851	9,950	1,924	2,636	4,443	5,070
Delaware	1,780	979	1,127	1,351	1,400	566	681	1,035	1,070
Maryland	5,237	2,604	2,740	3,610	3,770	1,555	1,954	2,799	3,180
NORTHEAST	**50,631**	**16,314**	**17,435**	**22,783**	**23,125**	**6,577**	**8,571**	**13,448**	**15,000**
Ohio	50,291	20,805	26,009	33,996	35,650	11,892	17,515	24,522	27,480
Indiana	46,395	23,871	29,485	37,695	40,650	17,920	24,616	32,737	37,060
Illinois	80,857	48,116	55,085	63,650	69,600	37,649	46,362	56,213	63,100
Iowa	86,178	28,221	42,117	55,889	65,900	22,302	37,864	53,427	64,000
Missouri	44,535	24,208	26,253	34,029	35,500	16,112	18,278	23,544	24,360
CORN BELT	**308,256**	**145,221**	**178,949**	**225,259**	**247,500**	**105,875**	**144,635**	**190,443**	**216,000**
Michigan	41,360	13,053	14,649	19,474	20,350	4,306	7,098	11,333	13,250
Wisconsin	45,516	10,859	13,392	18,553	19,850	3,566	5,147	8,589	10,360
Minnesota	71,748	27,189	35,033	45,225	50,550	12,102	18,780	27,390	32,160
LAKE STATES	**158,524**	**51,101**	**63,074**	**83,252**	**90,750**	**19,974**	**31,025**	**47,312**	**55,770**
North Dakota	41,782	26,952	27,273	31,112	30,250	753	864	1,619	1,810
South Dakota	28,289	11,926	13,941	16,587	17,950	3,483	5,386	7,759	9,030
Nebraska	43,205	25,730	29,224	35,147	37,800	13,370	18,578	24,687	28,260
Kansas	59,813	41,601	41,871	47,650	48,150	6,533	8,038	9,282	9,870
GREAT PLAINS	**173,089**	**107,209**	**112,309**	**130,496**	**134,150**	**24,139**	**32,866**	**43,347**	**48,970**
West Virginia	1,020	245	307	479	475	147	199	265	300
Kentucky	9,737	4,565	6,329	10,760	11,650	3,196	4,390	8,510	9,120
Tennessee	11,537	5,773	6,843	10,952	11,700	2,458	2,734	5,634	5,770
Virginia	9,281	3,769	4,309	6,150	6,150	2,243	2,972	4,487	4,850
North Carolina	14,847	7,982	8,828	13,535	14,300	5,279	6,696	10,671	11,920
APPALACHIAN	**46,422**	**22,334**	**26,616**	**41,876**	**44,275**	**13,323**	**16,991**	**29,567**	**31,960**
South Carolina	7,085	4,483	4,706	6,609	6,760	1,803	2,285	3,931	4,130
Georgia	9,177	5,408	6,255	9,924	10,920	4,036	4,836	7,637	8,080
Florida	1,230	1,010	1,182	1,792	1,970	584	773	1,207	1,230
Alabama	4,806	3,423	3,988	6,958	7,440	1,635	1,858	3,468	3,560
SOUTHEAST	**22,298**	**14,324**	**16,131**	**25,283**	**27,090**	**8,058**	**9,752**	**16,243**	**17,000**
Mississippi	6,099	6,977	6,893	10,190	10,600	441	310	593	610
Louisiana	5,145	6,414	7,034	9,715	10,200	357	231	403	350
Arkansas	13,086	12,657	11,484	14,095	14,400	294	725	292	300
DELTA STATES	**24,330**	**26,048**	**25,411**	**34,000**	**35,200**	**1,092**	**1,266**	**1,288**	**1,260**
Oklahoma	21,668	14,909	14,797	18,006	17,800	457	511	900	930
Texas	31,355	21,223	19,394	23,742	23,400	1,743	1,858	3,684	4,070
SOUTHERN PLAINS	**53,023**	**36,132**	**34,191**	**41,746**	**41,200**	**2,200**	**2,369**	**4,584**	**5,000**
Montana	16,011	11,687	11,392	13,225	13,530	121	107	101	100
Idaho	11,330	7,639	8,113	10,180	10,640	202	252	458	490
Wyoming	2,962	1,523	1,690	2,017	2,110	112	149	180	220
Colorado	11,062	6,937	7,338	8,488	8,900	1,032	1,632	2,397	2,810
New Mexico	1,898	1,041	1,229	1,541	1,620	52	117	246	270
Arizona	559	412	530	513	610	25	23	70	70
Utah	2,421	1,442	1,442	1,748	1,790	134	196	186	205
Nevada	277	201	253	269	280	9	21	3	5
MOUNTAIN STATES	**46,520**	**30,882**	**31,987**	**37,981**	**39,480**	**1,687**	**2,497**	**3,641**	**4,170**
Washington	9,706	6,891	7,330	8,471	9,100	307	269	490	520
Oregon	8,372	5,107	5,266	6,442	6,630	167	106	185	180
California	8,366	5,619	5,373	6,492	6,500	633	696	1,085	1,170
PACIFIC	**26,444**	**17,617**	**17,969**	**21,405**	**22,230**	**1,107**	**1,071**	**1,760**	**1,870**
TOTAL	**909,637**	**467,182**	**524,072**	**664,083**	**705,000**	**184,032**	**251,043**	**351,633**	**397,000**

[1] The Census in 1964 included self-propelled and pull types. The Census in 1969, 1974, 1978 and the estimated number for July 1, 1984 cover only self-propelled combines.

[2] The Census in 1969 included only corn heads on class 1-5 farms, ($2,500 or more of income). The Census in 1974, 1978 and the estimated number for July 1, 1984 cover all farms.

Principal Machines on Farms — 1984

STATE	PICK-UP BALERS					FIELD FORAGE HARVESTERS[1]				
	1964 Census Number	1969 Census Number	1974 Census Number	1978 Census Number	Estimated July 1, 1984 Number	1964 Census Number	1969 Census Number	1974 Census Number	1978 Census Number	Estimated July 1, 1984 Number
Maine	3,339	2,446	2,255	2,770	2,630	998	712	914	1,341	2,090
New Hampshire	1,681	1,266	1,197	1,448	1,410	747	385	612	553	720
Vermont	5,796	4,171	3,975	4,434	4,210	2,358	1,542	2,328	2,798	3,830
Massachusetts	2,343	1,774	1,600	1,900	1,780	1,412	744	923	1,185	1,610
Rhode Island	250	171	172	209	200	233	88	122	138	170
Connecticut	1,971	1,604	1,313	1,715	1,520	1,561	788	777	831	1,030
New York	38,107	31,074	27,495	30,762	28,200	20,710	13,815	17,363	20,891	27,600
New Jersey	3,073	2,357	2,066	2,458	2,180	2,181	1,171	1,127	1,255	1,420
Pennsylvania	41,873	35,571	32,195	38,745	36,200	20,794	12,240	15,485	19,187	27,850
Delaware	664	609	628	618	580	475	245	422	282	380
Maryland	6,845	5,750	5,159	6,083	5,600	3,961	2,177	2,603	2,943	4,300
NORTHEAST	**105,942**	**86,793**	**78,055**	**91,142**	**84,510**	**55,430**	**33,907**	**42,676**	**51,404**	**71,000**
Ohio	43,607	40,101	36,137	39,170	35,550	11,759	7,788	9,757	11,419	16,700
Indiana	25,459	23,414	21,705	24,655	22,500	7,523	5,344	6,121	6,912	9,630
Illinois	38,163	33,291	29,822	31,487	28,250	16,295	10,130	11,333	11,905	15,400
Iowa	60,111	55,456	47,461	47,729	41,000	20,937	14,245	17,179	19,479	26,300
Missouri	36,265	38,929	38,487	44,886	42,000	9,315	6,884	7,430	8,786	9,830
CORN BELT	**203,605**	**191,191**	**173,612**	**187,927**	**169,300**	**65,829**	**44,391**	**51,820**	**58,501**	**77,860**
Michigan	31,502	26,915	23,897	26,039	23,200	15,077	8,986	11,682	12,986	17,100
Wisconsin	63,921	56,939	54,962	59,847	57,000	48,149	27,199	38,341	43,574	60,800
Minnesota	55,896	51,600	46,689	50,534	46,000	26,024	17,761	20,825	23,437	29,650
LAKE STATES	**151,319**	**135,454**	**125,548**	**136,420**	**126,200**	**89,250**	**53,946**	**70,848**	**79,997**	**107,550**
North Dakota	15,823	15,623	14,831	15,380	13,900	9,555	6,614	5,911	5,539	5,890
South Dakota	14,441	14,657	13,835	14,258	12,850	10,810	9,755	11,254	11,364	12,160
Nebraska	19,907	18,988	17,309	17,160	15,250	13,268	11,232	12,632	13,935	15,800
Kansas	28,086	27,464	26,846	29,550	27,400	17,035	11,712	10,651	10,844	11,450
GREAT PLAINS	**78,257**	**76,732**	**72,821**	**76,348**	**69,400**	**50,668**	**39,313**	**40,448**	**41,682**	**45,300**
West Virginia	7,362	8,013	7,444	10,051	9,200	1,155	1,143	1,478	2,134	2,630
Kentucky	21,476	24,121	23,536	32,538	30,350	3,157	3,621	4,400	8,269	9,540
Tennessee	15,234	17,686	17,090	22,597	21,500	3,002	2,953	3,602	5,579	6,700
Virginia	16,105	16,035	15,285	19,222	18,000	4,450	4,181	4,675	6,343	7,350
North Carolina	10,322	10,053	10,115	12,591	12,150	3,365	2,695	3,841	4,317	5,120
APPALACHIAN	**70,499**	**75,908**	**73,470**	**96,999**	**91,200**	**15,129**	**14,593**	**17,996**	**26,642**	**31,340**
South Carolina	4,468	3,857	3,719	4,763	4,550	1,139	887	1,075	1,381	1,760
Georgia	8,917	7,118	6,678	8,909	8,530	1,696	1,455	1,722	2,652	3,440
Florida	1,419	1,692	1,910	2,885	2,880	543	447	629	916	1,390
Alabama	6,231	7,227	7,662	10,393	10,100	1,233	1,250	1,513	2,158	2,630
SOUTHEAST	**19,035**	**19,894**	**19,969**	**26,950**	**26,060**	**4,611**	**4,039**	**4,939**	**7,107**	**9,220**
Mississippi	6,618	7,045	7,431	8,752	8,350	1,697	1,531	2,130	2,168	2,530
Louisiana	5,064	4,831	4,594	6,192	5,800	775	763	872	1,872	2,110
Arkansas	6,456	7,500	8,040	11,022	10,520	1,181	1,014	1,047	1,882	2,140
DELTA STATES	**18,138**	**19,376**	**20,065**	**25,966**	**24,670**	**3,653**	**3,308**	**4,049**	**5,922**	**6,780**
Oklahoma	12,965	14,246	14,432	20,032	19,350	2,820	1,872	1,740	2,420	2,740
Texas	15,737	18,208	18,534	28,338	28,250	4,643	3,556	3,215	5,451	6,200
SOUTHERN PLAINS	**28,702**	**32,454**	**32,966**	**48,370**	**47,600**	**7,463**	**5,428**	**4,955**	**7,871**	**8,940**
Montana	11,458	11,059	10,613	11,857	11,150	1,736	1,695	1,512	2,130	2,440
Idaho	13,072	12,057	12,048	13,043	12,850	2,696	1,907	2,048	2,435	2,900
Wyoming	4,259	4,357	4,383	4,572	4,560	1,086	924	995	1,267	1,550
Colorado	9,600	9,504	9,505	10,564	10,600	5,252	3,744	3,755	4,418	5,140
New Mexico	2,340	2,532	2,833	3,427	3,540	560	490	591	786	1,000
Arizona	1,001	860	1,018	1,081	1,100	556	281	314	341	520
Utah	6,389	5,887	5,957	7,171	7,200	1,989	1,378	1,560	1,909	2,330
Nevada	1,264	1,177	1,299	1,524	1,510	291	189	233	367	500
MOUNTAIN STATES	**49,383**	**47,433**	**47,656**	**53,239**	**52,510**	**14,166**	**10,608**	**11,008**	**13,653**	**16,380**
Washington	9,759	8,658	8,215	9,327	9,250	3,734	1,837	2,234	3,019	5,220
Oregon	8,007	7,218	7,195	9,207	9,040	2,419	1,532	1,496	2,718	3,740
California	8,389	6,829	6,435	6,832	6,260	3,189	1,666	2,006	2,628	4,670
PACIFIC	**26,155**	**22,705**	**21,845**	**25,366**	**24,550**	**9,342**	**5,035**	**5,736**	**8,365**	**13,630**
TOTAL	**751,035**	**707,940**	**666,007**	**768,727**	**716,000**	**315,541**	**214,588**	**254,475**	**301,144**	**388,000**

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[1] The Census in 1964 and the estimated number for July 1, 1984 include shear-bar and flail types. The Census in 1969, 1974 and 1978 covered only the number of shear-bar harvesters.

Principal Machines on Farms — 1984

STATE	POWER TRACTOR MOWERS (Cutter bar type only) Estimated July 1,1958 Number	Estimated July 1, 1984 Number	SIDE DELIVERY RAKES Estimated July 1, 1958 Number	Estimated July 1, 1984 Number	MOWER CONDITIONERS[1] 1974 Census Number	1978 Census Number	Estimated July 1, 1984 Number
Maine	9,000	7,250	10,000	6,300	1,378	2,092	2,610
New Hampshire	4,400	3,300	5,000	2,680	605	1,029	1,270
Vermont	10,000	9,720	10,300	7,890	2,776	4,104	5,360
Massachusetts	5,800	4,320	6,000	3,780	1,048	1,568	1,890
Rhode Island	550	370	500	340	102	144	160
Connecticut	4,500	3,800	4,000	2,670	786	1,234	1,600
New York	55,000	60,300	61,000	50,000	18,701	26,674	33,800
New Jersey	7,000	4,950	8,000	4,280	1,636	2,518	2,620
Pennsylvania	60,000	66,700	67,000	52,700	20,428	30,551	35,800
Delaware	1,750	1,170	2,200	1,110	525	603	830
Maryland	14,000	12,400	13,000	9,650	3,614	4,944	5,800
NORTHEAST	**172,000**	**174,280**	**187,000**	**141,390**	**51,599**	**75,461**	**91,740**
Ohio	70,000	70,700	86,000	60,700	20,268	28,007	33,800
Indiana	64,000	55,500	71,000	44,700	12,503	16,162	20,800
Illinois	106,000	77,800	86,000	58,300	18,793	21,817	29,400
Iowa	115,000	116,500	127,000	97,900	19,636	26,631	34,450
Missouri	80,000	93,800	50,000	57,400	17,228	24,047	32,850
CORN BELT	**435,000**	**414,300**	**420,000**	**319,000**	**88,428**	**116,664**	**151,300**
Michigan	48,000	53,000	35,000	47,200	15,924	22,066	25,850
Wisconsin	93,000	114,500	115,000	98,000	36,232	52,723	67,000
Minnesota	96,000	106,000	108,000	95,500	22,979	32,101	38,650
LAKE STATES	**237,000**	**273,500**	**308,000**	**240,700**	**75,135**	**106,890**	**131,500**
North Dakota	42,000	44,500	26,000	25,000	5,971	6,395	8,570
South Dakota	44,000	51,900	31,000	25,500	4,445	5,715	6,330
Nebraska	61,000	60,800	41,000	38,800	9,225	15,128	15,500
Kansas	62,000	60,300	42,000	40,000	9,247	17,520	17,350
GREAT PLAINS	**209,000**	**217,500**	**140,000**	**129,300**	**28,888**	**44,758**	**47,750**
West Virginia	14,000	20,500	8,000	10,600	3,484	5,401	5,870
Kentucky	48,000	55,200	28,000	34,500	14,718	24,497	26,280
Tennessee	47,000	59,200	25,500	27,380	12,037	17,526	20,970
Virginia	28,000	36,400	25,500	26,500	8,714	13,099	16,170
North Carolina	27,000	35,800	15,000	17,800	6,824	10,767	11,550
APPALACHIAN	**164,000**	**207,100**	**102,000**	**116,780**	**45,777**	**71,290**	**80,840**
South Carolina	12,500	11,400	7,500	6,720	2,471	3,612	4,210
Georgia	23,000	19,700	12,000	11,940	6,383	9,451	10,000
Florida	7,500	4,300	2,200	2,150	4,000	7,114	7,500
Alabama	19,000	19,000	7,300	8,500	5,367	8,834	9,270
SOUTHEAST	**62,000**	**54,400**	**29,000**	**29,310**	**18,221**	**29,011**	**30,980**
Mississippi	21,000	24,600	5,000	11,000	5,282	8,041	8,200
Louisiana	12,000	12,400	6,000	7,020	4,421	7,396	7,560
Arkansas	24,000	23,700	12,000	11,750	5,521	8,653	10,500
DELTA STATES	**57,000**	**60,700**	**23,000**	**29,770**	**15,224**	**24,090**	**26,260**
Oklahoma	37,000	36,700	22,000	22,300	7,703	15,717	16,800
Texas	48,000	53,500	21,000	25,800	19,487	34,266	37,900
SOUTHERN PLAINS	**85,000**	**90,200**	**43,000**	**48,100**	**27,190**	**49,983**	**54,700**
Montana	23,000	24,400	15,000	15,680	3,205	7,513	8,990
Idaho	27,000	24,300	23,000	18,500	3,367	9,282	10,250
Wyoming	10,500	6,950	6,000	5,900	1,179	3,530	4,010
Colorado	24,000	18,000	25,000	16,300	2,712	7,449	8,320
New Mexico	8,000	5,340	8,000	4,770	1,005	2,451	3,190
Arizona	4,500	2,300	3,700	1,600	427	841	950
Utah	11,700	12,500	12,000	10,600	2,257	5,292	5,720
Nevada	2,300	1,780	2,300	1,700	384	1,286	1,540
MOUNTAIN STATES	**111,000**	**95,570**	**95,000**	**75,050**	**14,536**	**37,644**	**42,970**
Washington	27,000	24,000	16,000	15,300	4,218	8,536	9,720
Oregon	23,000	22,450	15,000	13,500	3,634	7,487	8,350
California	33,000	27,000	22,000	15,800	3,590	8,129	9,890
PACIFIC	**83,000**	**73,450**	**53,000**	**44,600**	**11,442**	**24,152**	**27,960**
TOTAL	**1,615,000**	**1,661,000**	**1,400,000**	**1,174,000**	**376,440**	**579,943**	**686,000**

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[1] Does not include windrowers with conditioning rolls.

Principal Machines on Farms — 1984

STATE	POWER ELEVATORS Estimated July 1,1951 Number	POWER ELEVATORS Estimated July 1, 1956 Number	POWER ELEVATORS Estimated July 1, 1984 Number	Manure Spreaders Estimated July 1, 1984 Number	Corn and Cotton Planters Estimated July 1, 1984 Number	Grain Drills Estimated July 1, 1984 Number
Maine	1,200	12,000	5,430	3,350	350	920
New Hampshire			2,570	2,130	310	65
Vermont			8,240	6,720	1,720	345
Massachusetts			3,700	2,450	940	120
Rhode Island			520	290	110	35
Connecticut			4,310	2,580	1,100	90
New York	7,200	35,000	71,800	42,900	21,200	28,850
New Jersey	2,000	5,500	6,310	2,570	2,580	2,630
Pennsylvania	9,600	38,000	76,500	44,400	36,000	43,400
Delaware	500	2,000	4,040	1,870	2,280	2,180
Maryland	2,500	7,500	16,830	8,950	9,270	9,640
NORTHEAST	**23,000**	**100,000**	**200,250**	**118,210**	**75,880**	**88,275**
Ohio	27,000	68,000	131,200	60,000	68,800	68,900
Indiana	30,000	66,000	130,300	53,100	70,600	55,900
Illinois	61,000	110,000	198,800	77,700	103,000	70,500
Iowa	80,000	122,000	208,800	106,000	114,500	65,700
Missouri	15,000	41,000	92,900	59,500	54,600	56,800
CORN BELT	**213,000**	**407,000**	**762,000**	**356,300**	**411,500**	**317,800**
Michigan	14,000	45,000	93,100	39,200	41,650	55,500
Wisconsin	15,000	48,000	146,700	89,700	73,400	70,500
Minnesota	46,000	90,000	164,300	81,500	88,300	81,600
LAKE STATES	**75,000**	**183,000**	**404,100**	**210,400**	**203,350**	**207,600**
North Dakota	28,000	45,000	79,700	22,100	16,550	64,750
South Dakota	24,000	40,000	70,800	30,800	33,300	36,600
Nebraska	36,000	60,000	109,700	47,200	49,600	47,000
Kansas	25,000	55,000	117,000	39,600	24,300	76,500
GREAT PLAINS	**113,000**	**200,000**	**377,200**	**139,700**	**123,750**	**224,850**
West Virginia	500	3,000	7,040	8,950	5,720	4,010
Kentucky	2,500	10,000	27,270	29,500	42,250	12,350
Tennessee	1,000	6,500	16,780	21,600	57,000	15,450
Virginia	2,000	11,000	21,100	23,100	28,750	18,750
North Carolina	1,000	7,500	22,750	22,500	80,300	25,200
APPALACHIAN	**7,000**	**38,000**	**94,940**	**105,650**	**214,020**	**75,760**
South Carolina	300	2,000	5,170	4,180	33,900	13,000
Georgia	900	6,000	15,420	7,080	42,650	11,150
Florida	300	1,500	4,090	1,280	6,550	1,930
Alabama	500	4,500	12,680	4,720	46,600	7,830
SOUTHEAST	**2,000**	**14,000**	**37,360**	**17,260**	**129,700**	**33,910**
Mississippi	700	4,500	8,660	5,390	58,000	9,220
Louisiana	400	1,000	2,830	3,100	20,250	8,230
Arkansas	900	4,500	10,570	7,570	23,900	14,800
DELTA STATES	**2,000**	**10,000**	**22,060**	**16,060**	**102,150**	**32,250**
Oklahoma	6,000	12,000	28,200	9,830	10,200	35,900
Texas	9,000	23,000	44,860	18,600	61,300	56,000
SOUTHERN PLAINS	**15,000**	**35,000**	**73,060**	**28,430**	**71,500**	**91,900**
Montana	7,500	17,500	31,350	11,600	1,210	24,200
Idaho	3,100	13,300	27,380	14,450	2,930	17,650
Wyoming	700	2,500	5,630	4,960	1,060	4,710
Colorado	7,000	13,000	28,230	14,750	6,890	17,650
New Mexico	500	1,500	2,880	2,410	3,500	2,230
Arizona	100	700	2,020	1,030	2,130	1,630
Utah	700	5,000	11,270	8,010	1,880	6,250
Nevada	400	500	1,050	1,180	70	365
MOUNTAIN STATES	**20,000**	**54,000**	**109,810**	**58,390**	**19,670**	**74,685**
Washington	2,000	8,000	24,360	15,300	2,030	14,280
Oregon	3,000	8,000	19,640	13,470	1,270	13,390
California	4,000	13,000	26,220	15,830	10,200	10,300
PACIFIC	**9,000**	**29,000**	**70,220**	**44,600**	**13,500**	**37,970**
TOTAL	**479,000**	**1,070,000**	**2,151,000**	**1,095,000**	**1,365,000**	**1,185,000**

Principal Machines on Farms—1984

STATE	MOTOR TRUCKS 1954 Adj. Cen. 1,000's[1]	1959 Census 1,000's	1964 Census 1,000's	1969 Census 1,000's	1974 Census 1,000's	1978 Census 1,000's	Estimated July 1, 1984 1,000's	Internal Combustion Engines[2] Estimated July 1, 1984 Number	Chain Saws Estimated July 1, 1984 Number
Maine	18.1	17.3	14.8	12.1	11.3	13.5	13.5	1,730	8,650
New Hampshire	8.3	6.8	5.6	4.0	3.7	4.4	4.4	1,620	2,870
Vermont	11.1	10.0	8.1	6.1	6.2	7.9	8.0	2,260	7,160
Massachusetts	14.3	12.3	10.6	8.4	7.7	9.9	10.1	2,330	5,230
Rhode Island	1.9	1.9	1.8	1.2	1.2	1.5	1.5	240	730
Connecticut	13.2	11.0	9.9	7.4	6.2	7.5	7.5	2,060	4,400
New York	70.5	66.5	62.9	53.6	53.6	61.2	62.2	26,900	57,600
New Jersey	24,4	20.9	17.3	14.3	12.9	16.5	16.8	3,000	6,900
Pennsylvania	71.0	71.4	69.5	57.3	55.5	66.3	67.2	26,500	50,500
Delaware	5.2	5.3	5.2	5.1	5.7	6.5	6.6	1,210	2,910
Maryland	22.0	21.2	21.3	19.5	21.3	25.5	26.1	5,880	14,160
NORTHEAST	**260.0**	**244.6**	**227.0**	**189.0**	**185.3**	**220.7**	**223.9**	**73,730**	**161,110**
Ohio	77.0	81.5	91.4	93.7	97.8	112.9	114.9	25,200	70,050
Indiana	77.4	88.2	99.0	100.1	103.9	120.2	122.2	25,900	75,550
Illinois	99.9	113.7	120.9	129.3	139.9	155.4	158.2	38,500	81,900
Iowa	84.3	99.8	106.7	121.4	137.1	148.0	150.7	40,800	65,100
Missouri	95.8	109.7	123.0	132.5	134.0	162.5	165.5	41,800	108,950
CORN BELT	**434.4**	**492.9**	**541.0**	**577.0**	**612.7**	**699.0**	**711.5**	**172,200**	**401,550**
Michigan	70.5	75.7	80.5	74.6	73.6	83.4	84.8	23,100	52,550
Wisconsin	87.0	90.6	97.0	89.0	92.3	100.9	102.8	44,300	106,750
Minnesota	90.0	103.4	112.5	116.9	130.1	147.4	150.2	59,900	76,300
LAKE STATES	**247.5**	**269.7**	**290.0**	**280.5**	**296.0**	**331.7**	**337.8**	**127,300**	**235,600**
North Dakota	66.8	75.5	81.6	91.2	101.3	109.2	111.0	44,600	4,950
South Dakota	47.7	52.3	56.5	57.8	65.1	66.9	68.2	30,000	3,800
Nebraska	72.0	83.4	93.1	96.4	108.5	120.5	122.5	40,800	16,200
Kansas	112.1	122.3	134.0	141.3	150.9	164.4	167.5	52,800	26,750
GREAT PLAINS	**298.6**	**333.5**	**365.2**	**386.7**	**425.8**	**461.0**	**469.2**	**168,200**	**51,700**
West Virginia	26.0	24.7	24.1	19.5	16.9	21.8	22.0	6,280	24,950
Kentucky	66.7	74.9	90.5	97.1	95.8	125.4	127.6	20,600	51,500
Tennessee	71.6	76.8	86.3	92.8	88.1	104.6	106.4	15,700	68,000
Virginia	57.5	58.0	59.2	55.9	55.5	70.1	71.1	15,200	56,300
North Carolina	84.5	91.1	101.1	99.3	93.5	113.5	115.5	19,800	100,750
APPALACHIAN	**306.3**	**325.5**	**361.2**	**364.6**	**349.8**	**435.4**	**442.6**	**77,580**	**301,500**
South Carolina	39.2	39.1	39.0	35.3	33.7	40.5	41.0	7,850	28,480
Georgia	76.2	72.8	76.6	70.9	69.2	79.8	81.1	16,200	39,250
Florida	36.6	36.4	40.6	37.8	40.1	54.1	54.9	15,700	8,960
Alabama	63.7	63.4	69.5	67.4	64.4	75.1	76.3	13,250	36,950
SOUTHEAST	**215.7**	**211.7**	**225.7**	**211.4**	**207.4**	**249.5**	**253.3**	**53,000**	**113,640**
Mississippi	76.2	71.5	75.1	66.4	60.5	65.5	66.3	12,750	43,650
Louisiana	47.3	47.2	51.3	44.7	41.6	50.4	51.0	15,200	23,930
Arkansas	76.2	73.2	80.6	71.4	69.5	88.0	89.1	17,200	36,650
DELTA STATES	**199.7**	**191.9**	**207.0**	**182.5**	**171.6**	**203.9**	**206.4**	**45,150**	**104,230**
Oklahoma	85.7	92.7	105.1	106.8	101.6	126.2	127.9	26,000	11,840
Texas	187.8	197.8	211.0	227.6	208.1	257.3	257.5	77,700	23,130
SOUTHERN PLAINS	**273.5**	**290.5**	**316.1**	**334.4**	**309.7**	**383.5**	**385.4**	**103,700**	**34,970**
Montana	48.5	52.8	58.2	58.3	61.9	68.9	70.2	23,400	14,130
Idaho	38.7	44.0	48.3	47.1	51.4	59.2	60.3	19,250	15,660
Wyoming	15.0	16.2	17.7	18.4	19.2	20.6	21.2	7,660	3,810
Colorado	48.5	51.7	55.9	55.5	56.9	66.4	67.7	24,600	7,210
New Mexico	21.3	20.3	23.4	18.8	20.0	26.4	27.1	9,230	3,600
Arizona	13.5	16.8	17.2	12.1	14.4	16.8	17.2	6,240	610
Utah	18.0	18.8	20.3	18.3	19.4	22.7	23.3	8,000	2,850
Nevada	3.9	4.5	4.5	5.0	5.4	6.5	6.6	1,860	720
MOUNTAIN STATES	**207.4**	**225.1**	**245.5**	**233.5**	**248.6**	**287.5**	**293.6**	**100,240**	**48,590**
Washington	55.4	60.2	64.2	56.7	57.1	71.4	73.1	20,100	27,180
Oregon	47.7	48.9	53.6	46.2	49.6	60.8	62.0	26,000	30,780
California	128.8	131.0	126.1	115.7	118.8	142.7	145.2	77,800	38,150
PACIFIC	**231.9**	**240.1**	**243.9**	**218.6**	**225.5**	**274.9**	**280.3**	**123,900**	**96,110**
TOTAL	**2,675.0**	**2,825.5**	**3,022.6**	**2,978.2**	**3,032.4**	**3,547.1**	**3,604.0**	**1,045,000**	**1,549,000**

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[1] Census numbers have been adjusted to bring them more in line with 1959 and later data based on the new definition of a farm.

[2] Includes engines used for stationary work such as irrigation, auxiliary engines on combines, balers, etc., and a small number of power units not elsewhere classified.

Measuring Three Industries: Materials Consumed in 1982 and 1977

■EVERY FIVE years, the U.S. Census Bureau takes the pulse of manufacturers.

Presented here are the preliminary data for the materials consumed by three major industry segments covered by *Implement & Tractor:* the farm, lawn-and-garden and construction equipment manufacturers.

As is frequently the case, some information presented here is limited to "delivered cost" of some types of materials, parts, containers and supplies because information about certain quantities cannot be collected or estimated properly.

To protect the identity of certain manufacturers, some data are not reported individually, although the information is included in the totals of all materials consumed.

The tables also do not reflect anything about certain materials that are produced and consumed by the individual companies rather than purchased outside. As a result, items like castings, forgings, engines and electric motors, which some companies produce themselves, do not show up in either the quantity or dollar column amounts.

The preliminary data presented here are subject to change, and will ultimately be superseded by a final report that will become part of Volume II, Industry Statistics, 1982 Census of Manufacturers.

On the cover... Endless rubber belts are installed on a hay baler at the New Idea plant in Coldwater, Ohio, adding a few more digits to the statistics on materials consumed by industry. Photo courtesy Goodyear Rubber Co.

How the Farm Equipment Industry Consumed Materials: 1977 and 1982

Material		1982		1977	
		Quantity[1]	Delivered cost (million dollars)	Quantity[1]	Delivered cost (million dollars)
Total materials, parts, containers, and supplies		(X)	4 868.8	(X)	5 030.4
Mill shapes and forms, except castings and forgings:					
Carbon steel:					
Bars and bar shapes	1,000 short tons	*327.0	171.2	560.1	220.6
Sheet and strip		*519.2	255.7	968.6	311.1
Plates		*115.1	63.3	249.5	89.1
Structural shapes		**81.8	39.2	*177.9	62.7
Wire and wire products		(S)	8.5	*32.1	18.6
All other carbon steel mill shapes and forms		*174.3	89.1	*237.4	103.8
Alloy steel, except stainless:					
Bars and bar shapes		*30.7	21.2	*56.3	25.5
All other alloy steel mill shapes and forms		(S)	6.5	(S)	9.5
Stainless steel mill shapes and forms:					
Sheet and strip		(S)	7.0	(S)	15.8
All other stainless steel mill shapes		(S)	2.6	(S)	2.1
Copper and copper-base alloy:					
All but pipe and tube	million lbs.	(S)	2.9	.1	5.2
Pipe and tube		*23.5	16.9	(S)	13.5
Aluminum and aluminum-base alloy:					
Sheet, plate, and foil		**3.8	2.9	**9.9	6.7
All other mill and extruded shapes and forms (wire, rolled rod and bar, powder, welded tubing, etc.)		*4.0	5.6	**15.2	14.8
Metal powders		(S)	.6	16.0	3.5
Metal stampings		(X)	68.0	(X)	48.2
Pig iron, excluding silvery iron	1,000 short tons	*20.0	4.6	31.3	5.9
Iron and steel scrap, excluding home scrap		65.4	19.2	166.1	18.8
Castings (rough and semifinished):					
Iron (gray and malleable):		*288.2	220.2	421.2	371.4
Steel:		111.2	41.8	18.0	20.7
Aluminum and aluminum-base alloy:	million lbs.	16.8	18.3	(S)	15.9
Copper and copper-base alloy:		(S)	5.7	(X)	(2)
Other nonferrous:	1,000 short tons	16.7	5.9	(X)	(2)
Iron and steel forgings:		**59.0	89.9	*99.0	96.9
Steel springs, except wire		*7.7	9.9	(X)	(2)
Fluid power (hydraulic and pneumatic) valves		(X)	25.4	(X)	(2)
Fluid power (hydraulic and pneumatic) hose or tube fittings and assemblies		(X)	30.5	(X)	(2)
Engines:					
Diesel and semidiesel:	thousands	94.5	380.3	199.6	432.3
Gasoline and other carburetor:		**171.3	27.3	163.9	42.7

(More...)

Materials Consumed *(continued)*

Material		1982		1977	
		Quantity[1]	Delivered cost (million dollars)	Quantity[1]	Delivered cost (million dollars)
Electric motors and generators:					
Fractional horsepower electric motors	thousands	.5	12.3	**226.6	11.1
Integral horsepower motors and generators (1 hp or more):		.6	11.7	*205.1	23.0
Bearings:					
Ball		(X)	63.6	(X)	57.5
Roller		(X)	34.6	(X)	43.2
Plain bearings and bushings		(X)	15.9	(X)	16.6
Speed changers, drives, gears, and industrial high speed drives		(X)	124.6	(X)	121.9
Pumps (complete assemblies):					
Hydraulic fluid power pumps, motors, and hydrostatic transmissions	thousands	*823.3	99.6		
Other pumps		(S)	9.0	592.1	49.4
Fluid power (hydraulic and pneumatic) cylinders and rotary actuators		(X)	32.4	(X)	
Hydraulic and pneumatic equipment, except pumps, compressors, valves, cylinders, and rotary actuators		(X)	45.0	(X)	95.4
Engine electrical equipment		(X)	65.7	(X)	61.7
Pneumatic tires and inner tubes	thousands	*52.6	192.1	5 660.0	208.4
Semi-pneumatic tires		*3.9	11.8	(3)	(3)
Rough and dressed lumber		(S)	9.1	(3)	(3)
Paints, varnishes, lacquers, shellacs, japans, enamels, and allied products	1,000 gal.	*5 008.9	36.2	*5 113.2	29.5
Rubber and plastics hose and belting		(X)	33.5	(X)	(3)
Fabricated rubber products, except tires, tubes, hoses, beltings, and gaskets		(X)	32.4	(X)	29.9
Fabricated plastic products, except gaskets		(X)	41.9	(X)	24.8
Bolts, nuts, screws, rivets, and screw machine products		(X)	87.8	(X)	96.3
Wire chain		(X)	2.1	(X)	(3)
Cutting tools for machine tools		(X)	17.5	(X)	(3)
All other materials and components, parts, containers, and supplies		(X)	1 440.0	(X)	1 648.3
Materials, parts, containers, and supplies, not specified by kind[2]		(X)	809.9	(X)	550.3

How the Lawn & Garden Equipment Industry Consumed Materials: 1977 and 1982

Material		1982 Quantity	1982 Delivered cost (million dollars)	1977 Quantity	1977 Delivered cost (million dollars)
Total materials, parts, containers, and supplies		**(X)**	**1 301.4**	**(X)**	**909.1**
Mill shapes and forms, except castings and forgings:					
Carbon steel:					
Bars and bar shapes	1,000 short tons	*48.7	21.3	*32.9	14.6
Sheet and strip		*147.6	65.7	118.8	49.9
Plates		**2.0	1.0	(S)	1.9
Structural shapes		*2.7	2.2	(S)	1.7
Wire and wire products		(S)	1.4	**6.9	4.0
All other carbon steel mill shapes and forms		**9.7	4.6	(S)	6.2
Alloy steel, except stainless		(S)	4.0	(S)	.3
Stainless steel mill shapes and forms:		(D)	(D)	(D)	10.2
Copper and copper-base alloy:	million lbs.	(S)	.5	(D)	1.1
Aluminum and aluminum-base alloy:		(S)	7.6	9.7	11.3
Metal powders		*7.7	9.8	(S)	7.3
Metal stampings	1,000 short tons	(X)	32.2	(X)	29.1
Pig iron, excluding silvery iron		(D)	(D)	–	–
Iron and steel scrap, excluding home scrap		(D)	(D)	(D)	(D)
Castings (rough and semifinished):					
Iron (gray and malleable):		*9.4	10.7	(S)	16.3
Steel:		(S)	3.5	1.0	.8

(More...)

Materials Consumed *(continued)*

Material		1982 Quantity[1]	1982 Delivered cost (million dollars)	1977 Quantity[1]	1977 Delivered cost (million dollars)
Aluminum and aluminum-base alloy:	million lbs.	*52.7	33.5	*31.0	20.1
Copper and copper-base alloy:		(D)	(D)	(X)	(3)
Other nonferrous:		18.6	5.6	(X)	(3)
Iron and steel forgings:	1,000 short tons	**1.5	2.8	(S)	2.9
Steel springs, except wire		(S)	.6	(X)	(3)
Fluid power (hydraulic and pneumatic) valves		(X)	2.2	(X)	(3)
Fluid power (hydraulic and pneumatic) hose or tube fittings and assemblies		(X)	.9	(X)	(3)
Engines:					
Diesel and semidiesel:	thousands	(S)	11.5	(D)	(D)
Gasoline and other carburetor:		*3 300.9	294.1	4 718.0	285.0
Electric motors and generators:					
Fractional horsepower electric motors		354.5	3.5	3,358.0	12.2
Bearings:					
Ball		(X)	7.7	(X)	5.5
Roller		(X)	4.1	(X)	3.6
Plain bearings and bushings		(X)	16.1	(X)	5.2
Speed changers, drives, gears, and industrial high speed drives		(X)	(D)	(X)	29.6
Pumps (complete assemblies):					
Hydraulic fluid power pumps, motors, and hydrostatic transmissions	thousands	*114.0	10.1	(D)	(D)
Filters for hydraulic fluid power systems		(X)	(D)	(X)	
Fluid power (hydraulic and pneumatic) cylinders and rotary actuators		(X)	1.7	(X)	
Hydraulic and pneumatic equipment, except pumps, compressors, valves, cylinders, and rotary actuators		(X)	(D)	(X)	6.3
Engine electrical equipment, spark plugs, magnetos, generators, starters, etc.		(X)	7.8	(X)	10.5
Pistons, piston rings, carburetors, and valves (intake and exhaust only)		(X)	(D)	(X)	3.4
Pneumatic tires and inner tubes	thousands	(S)	26.6	**8 165.0	26.3
Semi-pneumatic tires		*14.2	11.1	(3)	(3)
Rough and dressed lumber		(S)	1.3	(3)	(3)
Paints, varnishes, lacquers, shellacs, japans, enamels, and allied products	1,000 gal.	(S)	6.1	779.5	5.0
Rubber and plastics hose and belting		(X)	7.0	(X)	(3)
Fabricated rubber products, except tires, tubes, hoses, beltings, and gaskets		(X)	6.4	(X)	4.3
Fabricated plastic products, except gaskets		(X)	41.9	(X)	25.9
Bolts, nuts, screws, rivets, and screw machine products		(X)	26.5	(X)	23.6
All other materials and components, parts, containers, and supplies		(X)	332.8	(X)	249.1
Materials, parts, containers, and supplies, not specified by kind[2]		(X)	222.2	(X)	32.6

How the Construction Machinery Industry Consumed Materials: 1977 and 1982

Total materials, parts, containers, and supplies		(X)	**5,572.1**	(X)	**6,186.6**
Mill shapes and forms, except castings and forgings:					
Carbon steel:					
Bars and bar shapes	1,000 short tons	(S)	158.9	**328.0	131.2
Sheet and strip		**156.1	78.7	*270.1	91.3
Plates		(S)	304.3	1 291.2	462.5
Structural shapes		(S)	68.0	*321.5	111.9
Wire and wire products		(S)	12.1	(S)	9.9
All other carbon steel mill shapes and forms		(S)	119.2	*264.2	124.4
Alloy steel, except stainless:					
Bars and bar shapes		(S)	60.8	*81.7	63.3
All other alloy steel mill shapes and forms		**34.2	36.3	113.8	61.9
Stainless steel mill shapes and forms:		(S)	2.0	(S)	7.2

(More...)

Materials Consumed *(continued)*

Material		1982		1977	
		Quantity[1]	Delivered cost (million dollars)	Quantity[1]	Delivered cost (million dollars)
Copper and copper-base alloy:	million lbs.	(S)	6.8	9.7	11.2
Aluminum and aluminum-base alloy:		(S)	11.3	*1.9	13.7
Metal powders		(S)	6.9	17.2	9.9
Metal stampings	1,000 short tons	(S)	7.0	(X)	12.2
Pig iron, excluding silvery iron		(3)	(3)	3.0	.6
Iron and steel scrap. excluding home scrap		(S)	12.4	(82.8	9.8
Iron and steel forgings:		(S)	277.4	342.5	337.7
Castings (rough and semifinished):					
Iron (gray and malleable):		(S)	245.7	*270.2	344.8
Steel:		(S)	289.7	*188.6	347.9
Aluminum and aluminum-base alloy:	million lbs.	(S)	26.6	56.3	42.2
Copper and copper-base alloy:		(S)	6.0	(S)	3.3
Other nonferrous:		(S)	3.1	(X)	(3)
Engines:					
Diesel and semidiesel:	thousands	.1	372.9	100.0	493.6
Gasoline and other carburetor:		(S)	26.8	*91.4	51.8
Integral horsepower motors and generators (1 hp or more):		(S)	43.8	**64.7	88.7
Valves:					
Fluid power (hydraulic and pneumatic) and others		(X)	74.6	(X)	55.6
Fluid power (hydraulic and pneumatic) hose or tube fittings and assemblies		(X)	37.8	(X)	(3)
Pumps (complete assemblies&					
Hydraulic fluid power pumps, motors, and hydrostatic transmissions, all other pumps	thousands	(S)	125.1	(X)	114.4
Air and gas compressors, except refrigeration compressors		(S)	5.6	(S)	22.7
Bearings:					
Ball		(X)	57.7	(X)	50.0
Roller		(X)	65.5	(X)	69.7
Filters for hydraulic fluid power systems		(X)	5.3	(X)	(3)
Fluid power (hydraulic and pneumatic) cylinders and rotary actuators		(X)	89.2	(X)	(3)
Pneumatic tires and inner tubes	thousands	(S)	142.0	7 417.0	202.3
Speed changers, drives, gears, and industrial high speed drives		(X)	231.6	(X)	313.4
Paints, varnishes, lacquers, shellacs, japans, enamels, and allied products		(S)	24.3	(X)	19.8
Rubber and plastics hose and belting		(X)	52.8	(X)	(3)
Fabricated rubber products, except tires, tubes, hoses, beltings, and gaskets		(X)	9.7	(X)	12.3
Fabricated plastics products, except gaskets		(X)	8.5	(X)	6.0
Bolts, nuts, screws, rivets, and screw machine products		(X)	48.0	(X)	83.2
Fabricated structural metal products		(X)	100.8	(X)	121.6
Fabricated wire products, including wire rope, cable, springs, etc.		(S)	43.1	(X)	41.4
Cutting tools for machine tools		(X)	43.6	(X)	13.8
All other materials and components, parts, containers, and supplies		(X)	[3]1 690.5	(X)	[3]1 897.1
Materials, parts, containers, and supplies, not specified by kind[2]		(X)	539.7	(X)	332.3

(1) Some surveyed manufacturers submit estimates for line-item data. A single asterisk (*) indicates a figure containing 10 to 19 per cent estimated data. A double asterisk (**) indicates 20 to 29 per cent estimated data.
(2) Total cost of materials of establishments that did not report detailed materials data, including establishments that were not mailed a form.
(3) Data combined with second-to-last category "All other materials and components, parts, containers and supplies."
(-) Indicates zero.
(D) Withheld to avoid disclosing data for individual companies; data are included in higher level totals.
(S) Withheld because estimate did not meet publication standards on the basis of either the response rate or a consistency review.
(X) Not applicable.

FARM WHEEL TRACTOR

RETAIL SALES BY STATE, 1980-1983

State	1980			1981			1982			1983		
	2-wheel Drive 40 PTO HP & over	4-wheel Drive	Total Tractors	2-wheel Drive 40 PTO HP & over	4-wheel Drive	Total Tractors	2-wheel Drive 40 PTO HP & over	4-wheel Drive	Total Tractors	2-wheel Drive	4-wheel Drive	Total Tractors
Alabama	2,137	65	2,202	1,738	28	1,766	1,108	14	1,122	2,325	3	2,328
Alaska	25	6	31	56	1	57	10	.....	10	78	.....	78
Arizona	889	104	993	814	85	899	425	73	498	619	27	646
Arkansas	2,937	348	3,285	2,686	328	3,014	1,772	125	1,897	3,582	139	3,721
California	4,373	445	4,818	3,948	453	4,401	2,976	251	3,227	5,040	214	5,254
Colorado	1,101	230	1,331	982	218	1,200	634	121	755	1,188	126	1,314
Connecticut	230	6	236	175	2	177	145	2	147	491	−2	489
Delaware	137	9	146	108	3	111	79	5	84	258	4	262
Florida	2,479	114	2,593	2,314	70	2,384	1,636	55	1,691	3,622	68	3,690
Georgia	2,893	51	2,944	2,404	28	2,432	1,821	27	1,848	3,660	6	3,666
Hawaii	77	2	79	59	7	66	37	2	39	141	.....	141
Idaho	1,245	206	1,451	1,287	264	1,551	812	197	1,009	1,013	131	1,144
Illinois	5,551	891	6,442	4,529	871	5,400	3,580	600	4,180	4,658	433	5,091
Indiana	3,266	515	3,781	2,399	396	2,795	1,807	289	2,096	2,837	197	3,034
Iowa	6,363	773	7,136	5,437	654	6,091	4,319	475	4,794	4,149	284	4,433
Kansas	3,555	767	4,322	2,646	505	3,151	2,353	515	2,868	2,575	403	2,978
Kentucky	3,793	78	3,871	3,107	43	3,150	2,609	23	2,632	3,244	21	3,265
Louisiana	2,666	264	2,930	2,525	204	2,729	1,607	66	1,673	4,143	64	4,207
Maine	241	3	244	252	7	259	242	3	245	549	1	550
Maryland	691	32	723	563	18	581	492	14	506	1,440	17	1,457
Massachusetts	141	1	142	153	.....	153	144	1	145	517	.....	517
Michigan	2,588	349	2,937	2,353	376	2,729	1,613	197	1,810	2,569	143	2,712
Minnesota	4,533	767	5,300	4,130	645	4,775	2,793	479	3,272	3,029	386	3,415
Mississippi	3,241	260	3,501	2,478	171	2,649	1,563	71	1,634	2,571	31	2,602
Missouri	3,841	248	4,089	3,303	266	3,569	2,531	209	2,740	3,086	118	3,204
Montana	1,136	302	1,438	936	331	1,267	754	324	1,078	861	260	1,121
Nebraska	3,372	379	3,751	2,638	252	2,890	2,337	226	2,563	2,121	168	2,289
Nevada	105	12	117	72	12	84	66	5	71	79	4	83
New Hampshire	146	2	148	135	.....	135	158	.....	158	505	.....	505
New Jersey	296	4	300	224	.....	224	249	1	250	781	1	782
New Mexico	401	19	420	344	35	379	286	14	300	421	12	433
New York	2,502	115	2,617	2,210	173	2,383	1,741	77	1,818	2,825	54	2,879
North Carolina	3,495	55	3,550	2,778	50	2,828	2,022	34	2,056	4,072	12	4,084
North Dakota	1,670	905	2,575	1,885	887	2,772	1,322	740	2,062	1,354	491	1,845
Ohio	3,692	411	4,103	2,711	343	3,054	1,975	164	2,137	3,475	128	3,603
Oklahoma	2,615	373	2,988	2,334	295	2,629	1,891	279	2,170	2,557	218	2,775
Oregon	1,339	90	1,429	1,098	113	1,211	868	84	952	1,601	56	1,657
Pennsylvania	2,126	52	2,178	1,867	56	1,923	1,575	26	1,601	3,425	24	3,449
Rhode Island	16	.....	16	14	.....	14	12	.....	12	64	.....	64
South Carolina	1,416	50	1,466	1,049	32	1,081	779	17	796	1,524	10	1,534
South Dakota	1,696	287	1,983	1,450	292	1,742	1,355	238	1,593	1,230	221	1,451
Tennessee	2,940	96	3,036	2,653	57	2,710	1,923	29	1,952	3,803	20	3,823
Texas	9,423	624	10,047	10,409	580	10,989	6,886	299	7,185	13,786	308	14,094
Utah	626	34	660	583	24	607	466	23	489	655	21	676
Vermont	337	4	341	332	6	338	245	8	253	414	1	415
Virginia	2,101	25	2,126	1,618	19	1,637	1,455	15	1,470	2,677	6	2,683
Washington	1,853	200	2,053	1,371	191	1,562	1,168	134	1,302	1,951	125	2,076
West Virginia	456	.....	456	343	.....	343	325	1	326	480	1	481
Wisconsin	4,730	272	5,002	4,035	255	4,290	2,860	167	3,027	2,907	115	3,022
Wyoming	368	42	410	335	37	372	224	44	268	277	25	302
U.S. Government	220	.....	220	17	.....	17	98	.....	98	4	1	5
Miscellaneous	374	.....	374	265	.....	265	234	.....	234	605	3	608
TOTAL	**108,444**	**10,887**	**119,331**	**94,152**	**9,683**	**103,835**	**70,381**	**6,763**	**77,144**	**111,838**	**5,099**	**116,937**

Source: Farm & Industrial Equipment Institute. Figures do not include garden tractors, motor tillers or contractors' off-highway types. Tractors under 40 pto horsepower were not reported publicly by the FIEI prior to 1983. I&T estimates retail sales of such units were 46,742 in 1980; 47,800 in 1981; and 42,000 in 1982.

RETAIL SALES OF SELECTED FARM EQUIPMENT – Jan.-Dec., 1982 and 1983(1)
(In Units)

	Combines Self-Propelled		Corn Heads		Hay Balers(2)		Windrowers Self-Propelled Power Units		Windrowers Self-Propelled Total Heads		Grinder-Mixers		Shear-Bar Forage Harvesters(3)		Mower Conditioners All Types	
	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983
Alabama	113	110	29	16	105	112	1	.....	1	.....	74	67	35	12	112	84
Alaska	.....	.....	.....	.....	12	4	.....	.....	.....	.....	1	.....	1	2	6	5
Arizona	31	9	5	1	26	17	34	34	47	39	8	1	9	4	9	6
Arkansas	308	365	7	3	102	131	.....	.....	.....	.....	48	49	7	10	239	234
California	183	91	49	33	141	110	172	150	191	172	7	2	54	56	35	35
Colorado	228	147	114	43	332	290	159	136	170	149	34	18	61	39	106	114
Connecticut	1	.....	.....	.....	39	45	.....	.....	.....	.....	1	2	34	27	73	62
Delaware	15	24	10	14	11	8	.....	1	.....	1	7	3	2	2	7	11
Florida	40	29	17	5	64	56	2	.....	2	.....	13	8	26	13	65	57
Georgia	383	197	122	82	146	128	1	8	2	8	129	66	53	25	157	134
Hawaii	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Idaho	291	231	9	6	367	288	209	160	215	184	26	18	26	40	109	102
Illinois	1,714	1,417	1,790	1,342	199	217	7	11	8	12	312	281	140	116	464	455
Indiana	721	778	775	719	186	212	4	3	5	5	205	215	88	84	329	409
Iowa	1,895	1,411	1,904	1,323	231	193	82	39	102	46	749	703	278	187	689	585
Kansas	1,377	852	141	82	218	199	140	154	158	156	160	88	126	69	485	420
Kentucky	178	128	117	87	186	182	4	6	6	5	177	127	105	69	619	717
Louisiana	128	144	6	2	66	68	.....	.....	.....	1	12	11	13	2	50	21
Maine	4	3	5	.....	46	48	2	1	2	1	3	1	30	22	70	70
Maryland	75	71	85	61	73	88	9	5	10	5	34	21	53	26	97	129
Massachusetts	.....	.....	1	1	35	48	.....	.....	.....	.....	3	.....	33	32	56	57
Michigan	263	260	273	234	230	236	29	23	28	26	151	140	208	181	384	428
Minnesota	1,013	1,008	734	659	447	574	349	245	383	257	392	319	458	386	745	865
Mississippi	236	215	8	6	73	57	1	3	1	3	39	33	36	23	60	41
Missouri	732	435	255	128	246	278	16	14	20	15	304	188	77	91	901	799
Montana	397	350	3	.....	205	123	303	179	369	213	49	38	34	17	148	111
Nebraska	1,143	771	809	540	143	123	179	131	213	152	346	213	239	141	412	375
Nevada	2	1	.....	.....	29	23	46	33	50	38	1	3	5	6	9	7
New Hampshire	.....	.....	1	.....	25	45	.....	.....	.....	– 1	.....	.....	17	25	62	41
New Jersey	6	8	10	2	32	39	2	.....	2	.....	9	5	10	7	36	50
New Mexico	33	3	3	.....	121	101	39	46	39	50	5	5	16	9	26	24
New York	90	49	97	58	519	460	37	38	38	40	84	67	440	419	727	787
North Carolina	295	222	254	194	189	202	.....	1	.....	1	93	72	71	47	261	339
North Dakota	910	682	73	49	32	34	472	319	549	368	91	82	81	67	186	161
Ohio	382	481	405	356	301	359	9	9	9	10	220	167	154	130	547	618
Oklahoma	559	257	13	6	216	263	78	74	92	83	72	61	22	16	415	520
Oregon	130	130	16	2	209	215	127	93	145	114	10	17	21	21	115	135
Pennsylvania	108	94	131	97	548	595	35	25	37	28	242	156	351	272	775	817
Rhode Island	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	....	1	5	2
South Carolina	133	95	55	43	51	46	.....	.....	.....	.....	54	23	21	9	107	87
South Dakota	450	385	222	160	69	75	395	232	432	244	196	173	230	136	171	123
Tennessee	165	175	45	40	216	249	.....	1	.....	1	167	125	97	54	556	603
Texas	759	448	145	83	478	611	61	50	69	64	161	132	39	27	943	1,012
Utah	27	26	5	4	258	247	76	71	84	73	16	14	45	39	148	147
Vermont	3	1	3	.....	69	74	4	.....	4	.....	.....	.....	81	87	129	172
Virginia	112	84	95	60	198	195	4	2	5	2	82	63	119	82	517	506
Washington	207	238	22	19	218	248	76	72	89	79	10	9	55	52	112	115
West Virginia	5	3	3	5	95	79	1	.....	1	.....	21	9	24	24	129	128
Wisconsin	313	204	413	252	966	911	204	135	215	144	344	204	997	870	1,523	1,485
Wyoming	46	46	15	13	135	131	104	89	128	99	14	19	23	15	52	56
U.S. Government	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Miscellaneous (4)	1	73	.....	.....	.....	.....	1	.....	1	.....	.....	.....	.....	.....	2	.....
TOTAL	**16,205**	**12,751**	**9,294**	**6,830**	**8,905**	**9,037**	**3,474**	**2,593**	**3,922**	**2,887**	**5,176**	**4,018**	**5,145**	**4,091**	**13,981**	**14,261**

Data released Feb. 16, 1984, Farm & Industrial Equipment Institute.

(1) Includes revisions for prior months.
(2) For making bales of under 200 lbs.
(3) Pull-type, mounted, self-propelled.
(4) Sales reported as miscellaneous are retail sales which cannot be classified by state or as U.S. Government. They include sales and dispositions that do not go through usual marketing channels such as gifts to non-profit organizations, intra-plant or company transfers, etc.

NEW AGRICULTURAL WHEEL TRACTOR IMPORTS—JAN. 1981—JUNE 1984

Number of Units

Nation of Origin	Under 40 HP*	40-79 HP*	80-99 HP*	100 HP and Over*	HP Not Specifically Provided*	Not Elsewhere Specified, Excl. Industrial, Incl. Garden Types**	TOTALS
Canada							
6 mos., 1984	773	35	96	485	96	480	1,965
year 1983	53	59	111	718	1,191	534	2,666
year 1982	32	63	84	347	1,383	233	2,142
year 1981	73	47	121	461	1,915	153	2,770
United Kingdom							
6 mos., 1984	2,932	8,916	1,727	806	1	75	14,457
year 1983	5,173	13,502	1,840	843	32	102	21,492
year 1982	546	3,195	754	156	74	284	5,009
year 1981	814	6,031	1,109	682	15	93	8,544
Japan							
6 mos., 1984	27,083	4,750	87	86	148	8,462	40,613
year 1983	41,265	4,490	69	136	350	9,809	56,119
year 1982	37,534	3,063	13	231	774	8,101	49,716
year 1981	40,978	2,821	3	85	714	5,469	49,530
West Germany							
6 mos., 1984	77	2,780	1,265	249	.....	17	4,388
year 1983	97	10,570	2,747	363	6	33	13,816
year 1982	2	4,016	2,718	668	43	32	7,479
year 1981	2	6,653	2,421	750	7	8	9,841
Italy							
6 mos., 1984	87	882	339	30	.....	150	1,488
year 1983	152	1,598	357	236	2	2,803	5,148
year 1982	417	1,399	369	863	2	67	3,117
year 1981	767	1,839	430	341	57	116	3,559
Romania							
6 mos., 1984	81	557	.....	.....	.....	.....	638
year 1983	271	1,166	.....	.....	.....	17	1,454
year 1982	1,101	3,317	1	1	12	14	4,446
year 1981	558	3,050	.....	1	.....	2	3,611
France							
6 mos., 1984	.....	43	108	403	2	8	564
year 1983	133	819	234	8	.....	3	1,197
year 1982	.....	19	245	11	34	.....	309
year 1981	1	48	.....	17	.....	2	68
TOTALS							
6 mos., 1984	30,624	18,595	3,810	2,064	260	9,246	64,599
year 1983	47,289	34,085	5,367	2,311	1,603	13,406	104,061
year 1982	39,764	15,858	4,190	2,378	2,366	8,739	73,295
year 1981	44,208	21,012	4,084	2,339	2,714	5,858	80,215

Source: U.S. Dept. of Commerce, International Trade Admin., Office of Capital Goods and International Construction.
*Excluding garden tractors. **Including garden tractors.

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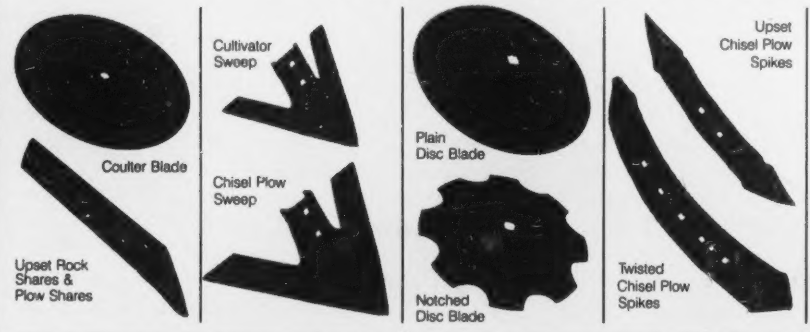

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DOLLAR VALUE OF FARM EQUIPMENT IMPORTS BY COUNTRY OF ORIGIN, Jan., 1979-June, 1984
(In thousands)

Country	Jan.-Dec. 1979	Jan.-Dec. 1980	Jan.-Dec. 1981	Jan.-Dec. 1982	Jan.-Dec. 1983	Jan.-June 1984
Canada	$831,155	$820,500	$706,276	$487,286	$453,551	$300,936
Mexico	10,082	9,080	9,699	11,349	18,563	6,654
Brazil	892	1,002	1,064	4,780	6,424	5,924
Sweden	4,818	4,456	2,784	3,023	2,873	1,694
Denmark	7,158	5,703	4,690	4,910	5,856	4,568
Netherlands	16,942	15,407	13,626	13,924	32,831	23,503
United Kingdom	209,967	215,932	153,589	93,806	163,678	118,933
Belgium	93,709	67,188	50,393	25,730	23,691	15,566
France	62,294	51,488	41,695	30,804	41,333	33,710
West Germany	231,521	236,578	197,110	169,087	248,015	112,181
Hungary	10,727	10,155	9,329	7,564	2,404	4,814
U.S.S.R.	2,715	1,716	1,296	128	1,255	458
Romania	11,648	11,611	12,598	15,461	6,088	2,659
Italy	78,523	94,794	100,853	95,092	99,219	78,147
Spain	9,239	5,559	3,561	6,541	2,946	3,630
Israel	2,616	3,218	2,777	2,677	2,988	2,801
New Zealand	5,312	6,665	8,630	9,792	11,885	7,359
Australia	5,937	4,366	7,306	4,662	3,209	2,394
Japan	267,599	189,753	202,000	181,056	204,818	158,143
China (Taiwan)	1,916	1,573	2,562	2,913	3,617	2,040
China (P.R.C.)	30	100	86	1,381	1,949	1,641
TOTAL	**$1,880,470**	**$1,773,033**	**$1,549,799**	**$1,179,734**	**$1,347,483**	**$895,497**

Source: U.S. Dept. of Commerce, International Trade Administration, Office of Capital Goods and International Construction.

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IMPORTS OF FARM EQUIPMENT BY PRODUCT

Product	Jan.-Dec., 1982 Quantity	Jan.-Dec., 1982 Value in Thousands of Dollars	Jan.-Dec., 1983 Quantity	Jan.-Dec., 1983 Value in Thousands of Dollars	Jan.-June, 1984 Quantity	Jan.-June, 1984 Value in Thousands of Dollars
Knives & Cutting Blades	7,524,683	$10,620	5,043,704	$ 7,957	5,295,966	$ 5,063
Plows & Listers	5,204	4,496	2,669	5,174	1,561	3,594
Cultivators & Weeders	14,342	17,862	17,201	18,844	11,055	11,757
Parts of Plows, Cultivators, Weeders & Listers	.....	21,074	.....	21,750	.....	15,811
Harrows, Rollers, Stalk Cutters, Soil Pulverizers	21,297	7,584	26,784	4,826	13,670	4,274
Parts of Harrows, Rollers, Stalk Cutters, etc.	.....	12,789	.....	13,548	.....	11,247
Planting, Seeding & Fertilizing Machinery	30,217	38,360	30,517	31,923	25,240	19,996
Parts of Planting, Seeding & Fertilizing Machinery	.....	8,987	.....	9,703	.....	6,151
Haying Machinery other than Mowers	7,483	11,207	7,281	10,948	4,724	8,041
Mowers except Lawn Mowers	14,370	25,089	10,469	19,319	8,078	17,096
Harvesting Machines, NES	9,141	110,813	7,974	81,975	5,947	36,958
Parts of Harvesting Machines	.....	58,099	.....	44,635	.....	29,296
Farm Wagons & Carts	4,767	7,684	3,939	5,339	1,813	2,538
Agricultural Machines & Implements, NES	.....	73,701	.....	96,978	.....	63,511
Parts of Agricultural Machines, NES	.....	53,662	.....	60,356	.....	43,460
Tractors, Agricultural, Wheel-Type, New, excluding Industrial*	73,295	505,373	104,061	678,073	65,239	434,592
Tractors, Agri., Used	3,349	23,311	3,548	26,786	2,612	20,185
Parts for Agri. Tractors	.....	183,024	.....	203,547	.....	155,201

Source: U.S. Dept. of Commerce, International Trade Administration, Office of Capital Goods and International Construction.
NES—Not elsewhere specified.
*Use of the term "Industrial" here is understood to refer to such machines as forklifts but not to industrial tractors as commonly defined in the farm and industrial equipment industry.

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FARM EQUIPMENT EXPORTS BY TYPE OF PRODUCT

Product	Jan.-Dec., 1982		Jan.-Dec., 1983		Jan.-June, 1984	
	Quantity	Dollar Value in Thousands	Quantity	Dollar Value in Thousands	Quantity	Dollar Value in Thousands
Combines, pull-type	1,895	45,765	934	22,487	874	23,655
Combines, self-propelled	5,861	225,909	2,882	125,377	2,001	97,148
Cultivators, tractor-drawn or mounted	4,522	9,213	3,636	5,874	2,030	4,110
Cultivators, NEC, and Weeders	2,745	4,638	2,504	3,804	1,939	4,033
Farm Elevators and Blowers	1,812	5,851	1,802	5,888	559	1,855
Farm Wagons and Carts	1,804	3,100	1,660	3,137	1,113	1,969
Parts for Farm Wagons and Carts	.....	1,155	.....	2,459	.....	811
Fertilizing Machines	4,528	14,319	6,711	17,266	2,600	8,015
Forage Harvesters	2,234	30,420	2,014	25,833	1,080	14,418
Harrows, Disk	4,357	18,713	5,208	17,879	1,463	7,606
Harrows, NEC, & Soil Pulverizers	5,908	7,922	6,244	6,897	3,824	3,451
Parts for Harrows, Stalk Cutters & Soil Pulverizers	.....	8,307	.....	4,454	.....	2,991
Harvesting Machines, NEC	7,390	63,524	5,200	42,927	3,434	42,539
Harvesting Machine Parts	.....	93,927	.....	114,069	.....	73,323
Hay Balers	7,113	45,785	5,160	36,603	3,886	26,540
Haying Machines, NEC (incl. rakes & tedders)	5,063	29,162	3,925	16,823	2,449	13,569
Parts for Haying Machines	.....	26,805	.....	25,109	.....	14,024
Mowers, Cutterbar, tractor-drawn	2,065	5,903	958	2,870	833	2,657
Mowers, Rotary, tractor-drawn (excl. lawn mowers)	9,351	7,192	5,891	5,029	7,396	3,966
Mowers, NEC, tractor-drawn (excl. lawn mowers)	1,641	4,899	1,335	3,861	1,259	4,394
Planting Machines	4,944	11,507	4,504	5,785	4,059	5,416
Plows, Disk	2,132	5,202	784	1,996	692	1,499
Plows, Moldboard	2,709	8,570	2,203	6,612	1,210	3,645
Plows & Listers, NEC	6,190	17,007	5,304	10,914	2,145	6,198
Parts for Plows, Listers, Cultivators & Weeders	.....	24,455	.....	17,774	.....	11,937
Seeding Machines	12,163	23,236	12,363	26,889	5,877	11,101
Parts for Planting, Seeding & Fertilizing Machines	.....	14,943	.....	16,821	.....	13,115
Farm Tractors:						
Under 40 PTO HP	1,133	5,925	637	3,299	353	1,832
40-59 PTO HP	646	7,644	502	4,774	277	2,627
60-79 PTO HP	1,066	17,599	600	8,721	412	6,294
80-99 PTO HP	858	19,883	727	16,340	520	11,136
100-119 PTO HP	2,250	63,492	1,440	46,764	540	15,655
120-139 PTO HP	4,191	124,063	2,263	80,365	1,107	38,177
140-159 PTO HP	1,877	61,223	1,240	46,586	1,005	37,460
160-179 PTO HP	1,400	64,045	1,211	53,807	763	34,589
180 HP & Over	3,253	182,641	1,989	117,916	1,363	83,508
Other Farm Tractors	1,216	18,103	1,724	15,494	800	7,269
Parts for Farm Tractors	.....	658,608	.....	585,095	.....	352,380

Source: U.S. Dept. of Commerce, International Trade Admin., Office of Capital Goods and International Construction.
NEC – Not elsewhere counted or classified.

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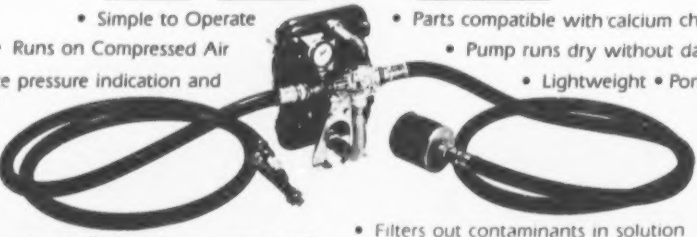

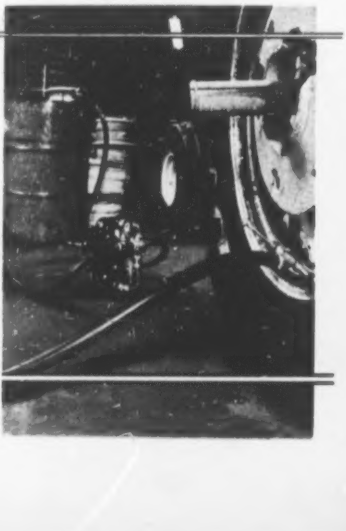

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VALUE OF U.S. FARM EQUIPMENT EXPORTS BY COUNTRIES OF DESTINATION

(Value in thousands of dollars)

Country	1982	1983	Jan.-June 1984
Western Hemisphere			
Canada	$997,453	$852,317	$537,013
Mexico	124,601	45,610	40,139
Guatemala	3,792	2,719	2,099
Honduras	2,825	3,200	1,808
Nicaragua	5,704	5,446	2,922
Costa Rica	1,772	3,083	2,733
Panama	13,032	3,797	990
Trinidad	6,110	4,064	954
Dominican Republic	3,836	6,142	1,921
Colombia	18,238	16,778	8,217
Jamaica	5,600	3,511	1,729
Venezuela	72,641	19,045	12,060
Brazil	19,522	9,048	7,342
Argentina	10,496	9,792	4,274
Chile	3,163	3,517	2,917
Ecuador	14,325	5,886	3,599
Peru	8,811	7,100	3,591
Europe			
Denmark	3,673	1,969	1,557
Sweden	8,046	8,760	7,177
United Kingdom	72,031	65,761	41,464
Netherlands	13,919	10,143	4,497
Belgium	66,237	55,046	32,834
France	118,393	97,761	51,390
West Germany	88,643	76,414	33,278
Hungary	7,409	13,203	4,983
Switzerland	4,208	2,844	2,068
Spain	10,549	7,871	3,563
Italy	8,895	6,660	5,793
Greece	2,161	7,416	14,521
U.S.S.R.	19,825	16,075	8,038
Middle East			
Iraq	9,587	1,380	775
Israel	15,629	15,181	10,811
Kuwait	2,506	1,446	1,086
Saudi Arabia	147,530	307,795	95,167
Jordan	4,307	1,641	805
Arab Emirates	5,434	5,297	979
Iran	1,913	4,199	184
Asia and Pacific			
India	2,075	4,037	878
Thailand	1,988	3,247	1,800
Singapore	15,489	12,731	6,994
Malaysia	2,411	2,428	757
Indonesia	3,181	5,440	2,583
Sri Lanka	561	5,397	3,562
China (P.R.C.)	2,039	1,791	15,020
Philippines	5,328	3,432	3,058
Korea	4,389	5,098	2,302
Japan	19,181	20,001	12,261
Australia	218,132	97,970	107,953
New Zealand	9,152	5,489	2,747
Africa			
Algeria	5,050	6,917	2,029
Libya	2,731	3,276	15,943
Sudan	11,545	10,081	2,821
Nigeria	6,666	1,668	311
Egypt	14,634	13,092	3,777
Rep. South Africa	63,923	57,023	31,848
Senegal	3,481	1,424	237
Zimbabwe	3,532	5,355	986
Zambia	527	2,972	715
Total U.S. Exports, Farm & Industrial Equipment	**$2,378,282**	**$2,014,069**	**$1,197,057**

Source: U.S. Dept. of Commerce, International Trade Admin., Office of Capital Goods and International Construction.

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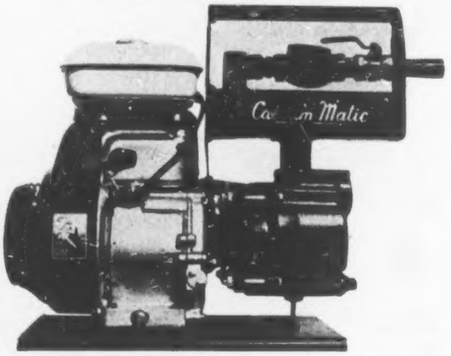

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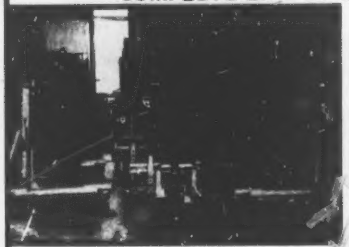

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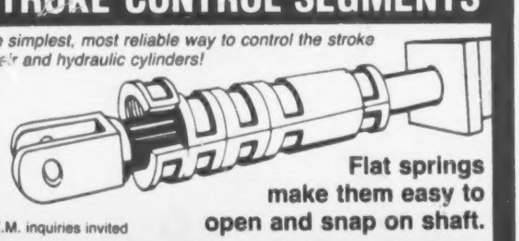

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2544, 1971 (Good)	2800
674 diesel, 1975 (Good)	4900*
674 diesel, ldr., 1977 (Good)	5500*
674 diesel, 1977 (Good)	5100
606 LP, 1964 (Fair)	2700
706 diesel, 1965 (Good)	3750*
1066 diesel, 1973 (Good)	7250
TD-7 diesel, dozer, 1967 (Good)	5800

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70, 1954, (Fair)	900*
70 diesel, ldr., 1955 (Good)	1800
2010 diesel, ldr., 1962 (Good)	2410
820 diesel, 1972 (Good)	3900
1520, 1971 (Good)	5350
4020 diesel, 1967 (Good)	4900
4020 diesel, 1968 (Good)	5500
2030 diesel, 1973 (Good)	5350
2130 diesel, 1972 (Fair)	3850*
450 diesel, crl. ldr., 1970 (Good)	5050*

LONG TRACTOR

R-9500 diesel, 1968 (Fair)	1950

MASSEY-FERGUSON TRACTORS

35, 1960 (Good)	2125
35, ldr., 1963 (Fair)	1950*
50, 1960 (Fair)	1500*
50, 1961 (Good)	2450
65 diesel, 1959 (Good)	2100*
65, 1960 (Good)	2400
65, 1960 (Fair)	1950
65 diesel, 1962 (Rough)	1300*
65 diesel, 1962 (Good)	2275
65 diesel, 1962 (Good)	2500
65 diesel, 1963 (Good)	2450
65, 1963 (Fair)	1915*
65, 1964 (Fair)	2100
135 diesel, 1970 (Fair)	2400
135 diesel, 1971 (Fair)	2750
165 diesel, 1966 (Fair)	2950*
165 diesel, 1967 (Good)	3500
165 diesel, 1972 (Good)	4150*
175 diesel, 1971 (Good)	4650
175 diesel, 1972 (Fair)	3850*
180 diesel, 1965 (Fair)	2750*
180 diesel, 1968 (Good)	3550
180 diesel, 1970 (Good)	3850*
180 diesel, 1971 (Rough)	3350*
235 diesel, 1975 (Good)	3875
245, 1976 (Fair)	4500
245 diesel, 1977 (Good)	6100
245 diesel, 1978 (Good)	6200*
255 diesel, 1977 (Good)	6350*
255 diesel, ldr., 1979 (Good)	7150
2200 diesel, ldr., 1969 (Good)	4900
265 diesel, ldr., 1977 (Good)	7650*
285 diesel, cab, ldr., 1978 (Good)	7850
285 diesel, cab, 1980 (Good)	8000
1085 diesel, 1977 (Fair)	6750
1085 diesel, cab, 1981 (Good)	8100*
2244 diesel, crl. ldr., 1966 (Good)	3400

MINNEAPOLIS-MOLINE TRACTORS

5-Star LP, 1958 (Fair)	1050*
M-5, 1961 (Good)	1450
M-602, 1964 (Good)	2300

OLIVER TRACTORS

S-88 LP, 1955 (Fair)	550*
550, 1966 (Good)	2200*

JONES FARM EQUIPMENT CO.
Dothan, Alabama
September 11, 1984

ALLIS-CHALMERS TRACTOR

200 diesel, 1972 (Rough)	2300

CASE TRACTORS

1070 diesel, 1978 (Fair)	3750*
1070 diesel, cab, duals, 1977 (Fair)	3400
885 diesel, 1980 (Good)	3450

DAVID BROWN TRACTORS

1410 diesel, 1976 (Fair)	2400*
990 diesel, 1968 (Fair)	1025
990 diesel, 1968 (Fair)	1300
880 diesel, 1968 (Good)	1450

DEUTZ TRACTOR

13006 diesel, 1973 (Good)	4750

FORD-FERGUSON TRACTORS

9N, 1940 (Good)	900*
9N, 1940 (Rough)	500

FORD TRACTORS

8700 diesel, duals, 1977 (Excellent)	10,000*
8600 diesel, cab, 1974 (Good)	6000
7000 diesel, 1971 (Good)	5400*
5000 diesel, 1968 (Fair)	3450
5000 diesel, 1967 (Fair)	3400*
4000 diesel, 1963 (Fair)	1500
3000 diesel, 1973 (Excellent)	4000
3000 diesel, 1966 (Rough)	2200
2000, 1968 (Good)	3150
2000, 1968 (Good)	2950
1600 diesel, 1977 (Good)	2200
850, 1955 (Excellent)	2500
641, 1958 (Good)	1800
641, 1958 (Rough)	875
640, 1956 (Excellent)	2450
640, 1955 (Fair)	1000
821, 1959 (Fair)	1000
Sup. Co6 diesel, (Rough)	950*
Maj. diesel, 1953 (Rough)	375
Jub., 1953 (Good)	1700*
8N, 1950 (Good)	1200*
8N, 1949 (Good)	1450*
8N, 1948 (Good)	1100*
8N, 1948 (Rough)	850
8N, 1948 (Good)	1500
8N, ldr., 1948 (Good)	1300
8N, 1948 (Good)	1300*

MASSEY-FERGUSON TRACTORS

1135 diesel, duals, 1975 (Fair)	5550
1105 diesel, 1976 (Good)	5550*
1085 diesel, 1976 (Good)	4100
1085 diesel, 1975 (Good)	3650
1080 diesel, 1970 (Rough)	2350
285 diesel, 1977 (Excellent)	8750
285 diesel, 1975 (Good)	5800
240 diesel, 1980 (Excellent)	6500*
175 diesel, 1971 (Good)	3550
175 diesel, 1970 (Good)	3300*
165 diesel, 1972 (Good)	3600
135 diesel, 1974 (Excellent)	3775*
135 diesel, 1972 (Excellent)	3550
135 diesel, 1966 (Good)	3150
65 diesel, 1963 (Fair)	1500*
TO30, 1952 (Good)	1250
TO30, 1952 (Fair)	800

INTERNATIONAL HARVESTER TRACTORS

1086 diesel, cab, 1979 (Good)	8600*
826 diesel, 1970 (Fair)	3750
784 diesel, cab, 1980 (Fair)	5175
784 diesel, cab, 1980 (Fair)	4900
766 diesel, 1975 (Good)	4600

(More...)

world crossroads of agricultural equipment

technological update

future plans

56th SiMA

International Agricultural Machinery Show
Paris, France

March 3-10, 1985

56th International Agricultural
Machinery Show
17th International Exhibition
of Mechanized Gardening
Equipment

Write in (56) on Reply Card

Auctions *(continued)*

684 diesel, 1981 (Good)	5550
504 diesel, 1966 (Rough)	750
424 diesel, 1965 (Good)	1600
140, 1959 (Fair)	1275*
JOHN DEERE TRACTORS	
8430 diesel, cab, 1978 (Good)	12,000*
4430 diesel, 1976 (Fair)	7600
4430 diesel, 1976 (Good)	8600
4230 diesel, duals, 1975 (Fair)	7000
4230 diesel, 1975 (Fair)	6500
4230 diesel, cab, 1975 (Excellent)	12,700
4020 diesel, 1969 (Good)	5500*
4020 diesel,1965 (Rough)	2525
4020 diesel, 1965 (Good)	5000
2840 diesel, 1979 (Excellent)	8300
2640 diesel, 1979 (Rough)	2700
2630 diesel, 1975 (Excellent)	5600
2040 diesel, 1977 (Good)	6800*
420, 1958 (Fair)	950*
420, 1957 (Good)	1400
LONG TRACTOR	
550 diesel, (Good)	2800
OLIVER TRACTOR	
1465 diesel, 1974 (Good)	2900

NOTES:
Prices reported are for individual sales at wholesale on an "as is," "cash and carry" basis. Prices reported are not averages.

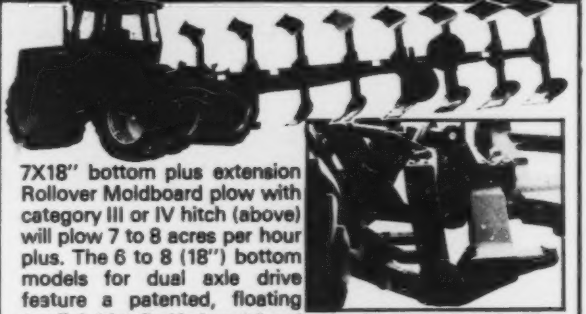
Condition Classifications:
EXCELLENT: Engine in perfect condition, 400 to 600 hours of use. Rubber—80% tread remaining, no breaks or cracks. Paint—original and bright. General appearance: excellent.

GOOD: Engine in good running condition. Rubber—70% tread remaining, no breaks or cracks. Paint—original or a good repaint job. General appearance: good over-all.

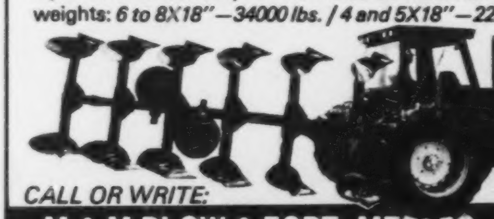
FAIR: Engine possibly in need of a minor overhaul. Rubber—60% tread remaining, some cracking evident in sidewalls. Paint—only fair, weathered and some rust apparent. General appearance: worn, some dents, minor parts (gage covers, etc.) missing or broken.

ROUGH: Engine obviously in need of a major overhaul. Rubber—smooth. Paint—scarred, weathered, rusty. General appearance: dents, ruptures, broken parts, loose wires, components (such as lights) broken, missing or inoperative.

ROLLOVER PLOWS
DESIGNED & BUILT FOR HEAVY FOLIAGE & STUBBLE



7X18" bottom plus extension Rollover Moldboard plow with category III or IV hitch (above) will plow 7 to 8 acres per hour plus. The 6 to 8 (18") bottom models for dual axle drive feature a patented, floating top link (detailed in inset) for plowing in uneven terrain. The 4 and 5X18" (5 bottom below) plows are designed for single axle drive which can include front-end assist. On land wheel span runs as follows: 4X18" - 12-foot; 5, 6 and 7X18" - 13-foot; 8X18" - 14 foot. All models feature a trash clearance 36" high, 36" or 40" point-to-point with shear bolt or rigid shanks. The following model frames carry a 1-year limited warranty for the indicated maximum tractor weights: *6 to 8X18"—34000 lbs. / 4 and 5X18"—22000 lbs.*



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CALL OR WRITE:
M & M PLOW & EQPT. MFG. CO., INC.
PHONE 915/653-7231•P.O. BOX 831•SAN ANGELO, TX. 76902

Write In (57) on Reply Card

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C4725-1

TWO DOLLARS

Implement & Tractor

The business magazine of the farm and industrial equipment industry

DECEMBER 1984

Special report: Italian Products in America

HASSENFRITZ INC.
MT. PLEASANT IA.
PARTS and SERVICE on the GO

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CONGRESSIONAL INFO SERV
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BETHESDA MD 20814

TAKING PARTS SALES TO THE COUNTRY

page 8

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Fuels and Lubricants

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Implement & Tractor

The business magazine of the farm and industrial equipment industry

December 1984 • Vol. 99 • No. 14

8: **Taking Parts Sales to the Country.** Hassenfritz, Inc., uses a van to deliver ordered parts...and to make the wholegoods sales rounds, too.

10: **Does Anyone Sell at a Profit?** Results of the first For Dealers Only survey indicate that many dealers don't exactly like their competitors.

11: **Analyzing the Mail-Order Tractor.** A look at the what, who and why behind the Agri-Power 5000 tractor that's being sold direct to farmers by mail order.

18: **Farm Equipment Shipments.** These important figures missed the November I&T deadline. Included are: Wheel Tractors, Attachments and Parts, Value of Shipments, 1979-1983; Farm Machinery and Garden Equipment, Attachments and Parts, Value of Shipments, 1979-1983; Shipments of Farm Machines and Equipment (in units) 1979-1983.

24: **Sharing Management Information with Fellow Dealers.** The second in our Management Modes articles, this looks at how Scharber & Sons, of Rogers, Minn., has used ideas from a dealer management group.

28: **Junior Terry's Salvage Business.** "We're a breed apart," says this veteran Missouri dealer of the used parts fraternity. Among his tips: combines make their own parts warehouses.

On the cover...Salesman Gary Lane delivers parts to farmer Kenneth Hatch in southeast Iowa.

DEPARTMENTS

I&T Update 4
Editor's Notebook 6
Auction Prices 14
Industry in Motion 22
New Literature 23
Farm Equipment Patents 26
What's New 32
Brown Pages 37
Classified Ads 42
Index to Advertisers 42

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I&T Update

The Big Shakeup: IH Ag Sets Merger With Case

Pending government approval, the bulk of International Harvester's ag division will become part of Tenneco, Inc. and be merged with the J I Case ag operations sometime next year.

The government action should take at least 60 days starting from Nov. 26, when the purchase plan was announced by James L. Ketelsen, Tenneco's chairman and chief executive officer. The plan is not a total buyout. IH would stay in the truck business.

Executives on both sides caution that there will be no changes in normal operations (like parts distribution and credit for dealers and customers) until after the deal is formally closed.

Here's the broad outline of the purchase plan:

Assets and machinery

Some 30 to 40 per cent of the nation's tractor production capacity would disappear when Tenneco picks up machine tools from the IH plants at Rock Island, Ill., and Memphis, Tenn., leaving IH to dispose of the buildings.

These plants built the IH 2WD tractors in the 30 series (80 to 114 pto hp) and 50 series (136 to 187 pto hp) and the 4WD 60 series (130 to 170 pto hp.)

Tenneco would take over the Doncaster, England, plant that builds the IH 84 series (42 to 73 pto hp.) These units compete with the British-built Case/David Brown tractors from 43 to 85 pto hp.

The small IH 200 series tractors, with 18 to 30 engine hp, were not mentioned. These are built by KIMCO of Japan, of which IH owned half until selling out to Komatsu in February, 1982. Case has no offerings in that size range.

Tenneco would take over the IH combine plant at East Moline, Ill.; the implement facility at Hamilton, Ont., Canada; and the engineering works at Hinsdale, Ill., along with the parts and service network. Tenneco also gets rights to negotiate for IH plants in Germany, France and Denmark.

People and pensions

The rights to deal with about 1,750 IH outlets in North America go to Tenneco, which plans to blend them with the roughly 950 Case dealers. Consolidation, said Ketelsen, would mean about 15 per cent, or 400 dealerships, would have to "be rationalized." Case has about 160 company-owned stores.

Details of which dealer survives, and how cancellations are decided, were not disclosed when IH dealers went to Dallas and Case dealers went to Kansas City on November 28-30 to hear of the purchase plan from Ketelsen and other leaders of Tenneco, Case and IH.

"The changeover to Tenneco will be handled by professionals in a spirit of cooperation," said one IH executive who recently helped transfer the IH construction business to Dresser Industries. "Right now, nothing changes until the government approves, and after that we'll do everything we can to protect the people who bought and sold IH products."

Tenneco reportedly will absorb about 3,000 IH corporate employees and will cover $75 million in unfunded IH pension liabilities.

Unsold IH units

Tenneco's purchase price of $260 million in case and $170 million in stock does not include unsold IH finished goods, but Tenneco would have a hand in disposing of the machinery.

Bill Greenhill, IH press officer, said IH Credit Corp. will continue holding, for about two years, the notes on $1 billion in wholesale receivables—units at dealerships or in IH storage lots. Tenneco will handle the details of this paper, collecting a processing fee before paying IHCC.

Another $800 million in consumer receivables will continue being paid directly to IHCC by retail purchasers. Tenneco will lend a hand if collection or repossession problems arise.

Future machinery

In his talks to dealers, Ketelsen reminded them of the new $355 million Consolidated Diesel Corp. (CDC) engine plant, a joint Case-Cummins venture.

Ketelsen indicated these CDC engines will power future ag machines, but he gave no timetable for new product introductions. Nor did he tell the dealers exactly what the new operation would be called, other than to say "we have two strong names, both over 100 years old. We're going to use both."

Bleak October for Tractors, But Other Sales Improved

Tractor retail sales took a sharp drop in October, except for the healthy rise in under-40-hp units. Total for the year is now under the 1983 level. But sales of combines, conventional balers, forage harvesters and mower-conditioners improved. (October, 1983 sales were vastly different—up 16 per cent for tractors, with indicated implements down from 13 to 38 per cent.)

Unit Retail Sales

	October			January-October		
	1984	1983	Pct. Change	1984	1983	Pct. Change
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	4,454	3,587	+24.2	44,617	40,673	+ 9.7
40-99 hp	3,425	3,822	−10.4	32,817	33,018	− .6
100-139 hp	1,191	2,235	−46.7	8,271	12,917	−36.0
Over 140 hp	1,862	2,308	−19.3	12,277	11,244	+ 9.2
Total 2-wheel drive	**10,932**	**11,952**	**− 8.5**	**97,982**	**97,852**	**+ .1**
4-wheel drive						
Under 200 hp	101	335	−69.9	1,266	1,698	−25.4
Over 200 hp	148	442	−66.5	2,074	2,468	−16.0
Total 4-wheel drive	**249**	**777**	**−68.0**	**3,340**	**4,166**	**−19.8**
Total All Tractors	**11,181**	**12,729**	**−12.2**	**101,322**	**102,018**	**− .7**
S-P Combines	2,188	2,100	+ 4.2	8,754	10,277	−14.8
Balers (under 200-lb. bales)	408	330	+23.6	7,778	8,642	−10.0
Forage Harvesters (shear-bar type)	661	650	+ 1.7	3,053	3,744	−18.5
Mower-Conditioners	708	578	+22.5	12,222	13,532	− 9.7

Tell Us What You Think!

Your view of the planned takeover of the IH ag division by J I Case is important.

Please take a moment and jot your thoughts on the special postage-paid survey form inside the front cover of this issue, and get it in the mail. I&T will report the survey results early next year.

I&T
SINCE 1886

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

JONES FARM EQUIPMENT, INC.
Dothan, Ala.
October 9, 1984

ALLIS-CHALMERS TRACTORS

185 diesel, 1974 (Fair)	3300*
WD, 1950 (Rough)	200

DAVID BROWN TRACTORS

990 diesel, 1964 (Rough)	575
880 diesel, 1964 (Rough)	500
880 diesel, 1964 (Rough)	500

MASSEY-FERGUSON TRACTORS

2745 diesel, duals, 1979 (Good)	7950
1135 diesel, 1975 (Fair)	3700*
1130 diesel, 1968 (Fair)	3850
1105 diesel, 1974 (Fair)	3500*
1100 diesel, 1967 (Fair)	2600
1100 diesel, 1966 (Rough)	2000
1085 diesel, 1975 (Good)	4000
275 diesel, 1977 (Excellent)	6500*
265 diesel, 1976 (Good)	5500
265 diesel, 1975 (Fair)	4800
245 diesel, 1978 (Excellent)	5100*
188 diesel, 1975 (Rough)	1800
175 diesel, 1969 (Good)	3750
175 diesel, 1967 (Excellent)	4200
175 diesel, 1967 (Good)	3600
165 diesel, 1974 (Fair)	2875
165 diesel, 1970 (Good)	3900
165 diesel, 1968 (Fair)	2675*
165 diesel, 1966 (Rough)	1400
135 diesel, 1970 (Good)	3000
135, 1966 (Fair)	2050
130 diesel, (Rough)	1300
58 diesel, 1964 (Good)	2025
35, ldr., 1957 (Fair)	1400
25 diesel, 1964 (Good)	2500*
TE20, 1948 (Rough)	625*

FORD-FERGUSON TRACTORS

9N, 1946 (Excellent)	1500*
9N, 1944 (Good)	1025

FORD TRACTORS

TW30 diesel, cab, duals, 1980 (Excellent)	19,000
TW30 diesel, cab, duals, 1980 (Excellent)	19,000
8000 diesel, 1970 (Rough)	2675
8000 diesel, 1970 (Fair)	3650
7000 diesel, 1973 (Fair)	4750*
6700 diesel, 1981 (Excellent)	12,000
5000 diesel, 1968 (Rough)	2600*
4600 diesel, 1978 (Fair)	3350
4600 diesel, 1978 (Fair)	3600
2000, 1969 (Excellent)	4600*
2000 diesel, 1963 (Excellent)	2350*
2000 diesel, 1963 (Rough)	950*
861, 1959 (Excellent)	2500*
740, 1955 (Excellent)	1500
650, 1966 (Excellent)	2200
641, 1958 (Good)	1975
641, 1958 (Good)	2200*
641, 1958 (Rough)	1275
640, 1956 (Rough)	750
Maj. diesel, 1954 (Rough)	360
Sup. Dex., 1959 (Fair)	1475
Dexta, 1959 (Excellent)	2100
8N, 1952 (Good)	1525
8N, 1949 (Excellent)	1950
8N, 1948 (Fair)	850
8N, 1948 (Fair)	925
8N, 1948 (Good)	1400*
8N, 1948 (Good)	1350

INTERNATIONAL HARVESTER TRACTORS

856 diesel, duals, 1969 (Rough)	3300*
674 diesel, 1977 (Good)	4400
554 diesel, 1977 (Rough)	2300
504 diesel, 1963 (Fair)	1250
464 diesel, 1973 (Fair)	2900*
424 diesel, 1967 (Excellent)	2650
B414, 1964 (Good)	1950
B414 diesel, 1962 (Good)	1400*
B414 diesel, 1962 (Rough)	550
400, 1955 (Rough)	400*
Sup. A, 1954 (Good)	1000
Sup. A, 1954 (Fair)	600
A, cutter, 1944 (Good)	420
Cub, 1948 (Fair)	675

JOHN DEERE TRACTORS

6030 diesel, 1974 (Good)	7000*
5020 diesel, duals, 1968 (Rough)	3000*
4020 diesel, duals, 1967 (Good)	5000*
4010 diesel, 1962 (Rough)	1600
4010 diesel, 1962 (Good)	3500
2640 diesel, 1977 (Excellent)	6100
2640 diesel, 1977 (Excellent)	6600*
2010 diesel, 1963 (Fair)	1300*
820 diesel, 1973 (Fair)	2050
420, 1956 (Rough)	700

LONG TRACTORS

560 diesel, (Good)	3150
560 diesel, (Fair)	2000
360 diesel, (Excellent)	3800

KUBOTA TRACTOR

B8200 diesel, mo., 1984 (Excellent)	3500

OLIVER TRACTORS

1850 diesel, 1968 (Rough)	1300*
1365 diesel, 1975 (Good)	2100*
1250 diesel, 1965 (Fair)	1150*

WHITE TRACTORS

2-150 diesel, duals, cab, 1976 (Good)	6100
2-150 diesel, 1976 (Good)	5000*

ZETOR TRACTOR

8011 diesel, Crystal (Rough)	1150

YODER & FREY, INC.
Archbold, Ohio
October 9, 1984

INTERNATIONAL HARVESTER TRACTORS

C, 1949 (Rough)	700
Sup. C, 1950 (Fair)	850*
A, cult., 1944 (Fair)	650
A, 1945 (Fair)	650
Cub,	650
Cub, (Good)	660
SH, 1953 (Good)	1600
M, 1949 (Rough)	560
M, 1950 (Fair)	650*
M, 1946 (Rough)	550*
M,	625
M, 1947 (Rough)	500*
Sup. M, 1951 (Fair)	650*
Sup. MTA, 1951 (Fair)	1200*
250 diesel, (Fair)	1435
340, 1959 (Fair)	1700*
460, 1960 (Rough)	825*
460,	680
460, 1959 (Good)	1400
560, (Good)	1500
560, 1960 (Good)	1800
560, 1962 (Good)	1850
544, ldr., 1969 (Good)	5450*
574, 1975 (Good)	4400
656 diesel, 1970 (Rough)	3700*
656, 1969 (Fair)	3300
656, 1968 (Good)	4500*
706, 1965 (Fair)	2950*
706, 1963 (Good)	2950*
756, 1969 (Good)	6200*
756, 1970 (Fair)	3300*
806 diesel, 1962 (Rough)	1700*
806, 1966 (Fair)	3800*
806 diesel, 1965	3450
806, 1963 (Fair)	2400
826 diesel, 1970 (Fair)	4250
856 diesel, 1967 (Fair)	5000*
856 diesel, 1970 (Fair)	4100*
856 diesel, 1967 (Fair)	5800*
966, 1974 (Good)	7600*
966 diesel, 1975 (Good)	7800*
966, 1978 (Good)	10,800*
986, 1978 (Good)	12,200*
1066, 1975 (Fair)	7000
1066, 1974 (Fair)	5700*
1066, 1974 (Fair)	6800*
1066 diesel, 1975 (Good)	7700*
1086, 1974 (Good)	7700
1086, 1976 (Good)	11,250*
1086, 1978 (Good)	13,400*
1206 diesel, 1963 (Fair)	4500*
1206, 1964 (Fair)	4900
1466, 1969 (Fair)	6700*
1466, 1976 (Good)	7450
1486, 1979 (Good)	12,500*
1566 diesel, 1972 (Fair)	7100*
1566, 1971 (Good)	6500*
1566, 1975 (Good)	9500*

JOHN DEERE TRACTORS

A, 1952 (Rough)	550*
B, 1947 (Good)	850
G, 1946 (Fair)	450*
40, cult.,	525
60, 1955 (Fair)	860
70, 1955 (Fair)	750
70, 1966 (Good)	960
70, 1956 (Rough)	925*
730 diesel, 1958 (Fair)	2050
730 diesel, 1959 (Fair)	850*
2010, 1964 (Fair)	1800*
2010, 1963 (Rough)	1900*
2010, 1962 (Fair)	1900
2010 diesel, 1962 (Good)	2200*
2510, 1967 (Fair)	3600
3010 diesel, 1963 (Rough)	2200*
3010 diesel, 1964 (Fair)	3000*
3020, 1964 (Good)	3000
3020 diesel, 1967 (Excellent)	6550
4000, 1972 (Good)	6400*
4000, 1973 (Good)	6500*
4010 diesel, 1964 (Fair)	3500*
4010 diesel, 1964 (Good)	4075
4020 diesel, 1967 (Rough)	4500*
4020 diesel, 1966 (Fair)	5650*
4020 diesel, 1965 (Good)	5800*
4020 diesel, 1968 (Good)	6500
4020, 1967 (Fair)	3850*
4020 diesel, 1966 (Fair)	5400*
4020 diesel, 1965 (Good)	5700*
4230 diesel, 1975 (Good)	7600*
4230 4x, 1975 (Fair)	6000*
4230 diesel, 1975 (Good)	8650*
4430 diesel, 1974 (Good)	13,000*
4430 diesel, 1976 (Good)	11,200
4430 diesel, 1973 (Rough)	8000*
4520, cab, 1970 (Fair)	6000
4520, 1970 (Fair)	5575
5020 diesel, 1969 (Fair)	4450
5020 diesel, 1969 (Fair)	4600
7020 diesel, 1958 (Fair)	1100*
7520 diesel, 1969 (Fair)	11,250*

DAVID BROWN TRACTORS

DB 950, 1966 (Rough)	600*
DB 990, 1967 (Fair)	2000*
DB 1200 diesel, 1968 (Fair)	2500*

WHITE TRACTORS

2-85 diesel, 1976 (Fair)	7000*
2-1350, 1979 (Fair)	13,000*
2-35, 1980 (Good)	5000

FORD TRACTORS

8N, 1947 (Fair)	850*
8N, 1946 (Fair)	1050*
8N, 1950 (Rough)	1050*
8N, 1947 (Fair)	1100*
8N, 1946 (Rough)	950*
9N, 1942 (Good)	900*
9N, 1946 (Rough)	1100
9N, 1950 (Rough)	950*
9N, 1943 (Rough)	900*
9N, 1944 (Rough)	950
9N, 1946 (Rough)	950*
9N, 1942 (Rough)	900*
NAA, 1950 (Good)	2000
800, 1957 (Rough)	1600*
800, 1957 (Good)	2350
800, 1957 (Rough)	1500
801, 1957 (Rough)	1125
901 diesel, 1955 (Fair)	1250
4000, 1964 (Rough)	1025*
4000, 1965 (Rough)	2100*
8000, 1973 (Fair)	4150*
8000, 1973 (Fair)	3600*
8000, 1973 (Fair)	4500*
8600 diesel, 1975 (Good)	6900*
Jub., 1953 (Fair)	2000*
Jub., 1953 (Rough)	1600*
Jub., 1953 (Rough)	1700*
971 diesel, 1957 (Rough)	600
3400, ldr., (Rough)	2600

COCKSHUTT TRACTOR

570, (Fair)	700*

FERGUSON & MASSEY-FERGUSON

TO-20, 1945 (Fair)	725*
30, 1950 (Fair)	1135*
35, 1953 (Fair)	1750
35, 1960 (Rough)	2100*
50, 1961 (Rough)	1675
85, 1962 (Rough)	1185
165, 1969 (Rough)	2700*
175 diesel, 1971 (Rough)	3000*
180 diesel, 1968 (Fair)	3225
275, 1977 (Fair)	5350
1080 diesel, 1970 (Rough)	3000
1100 diesel, 1972 (Fair)	2950
1100, 1967 (Rough)	2600*
1135 diesel, (Fair)	6500*
1805, 1974 (Rough)	8000*
Sup. 90, 1965 (Rough)	1175*
1150 diesel, 1971 (Fair)	4000*

MINNEAPOLIS-MOLINE TRACTORS

445 diesel, 1962 (Rough)	650*
M-670, (Rough)	700*

(More...)

world crossroads of agricultural equipment

technological update

future plans

56th SiMA

International Agricultural Machinery Show
Paris, France

March 3-10, 1985

56th International Agricultural
Machinery Show
17th International Exhibition
of Mechanized Gardening
Equipment

Write in (8) on Reply Card

Auctions *(continued)*

ALLIS-CHALMERS TRACTORS

B,	340
B, 1942 (Rough)	300*
CA,	475
CA, 1949 (Fair)	1125
WC, 1940 (Rough)	320
WD, 1940 (Fair)	200*
WD-45,	680
D-14,	485
160, 1968 (Fair)	3000*
185 diesel, 1976 (Good)	4250*
185 diesel, (Fair)	5100*
190 diesel, 1964 (Rough)	2450*
190XT diesel, 1967 (Fair)	4100*
200 diesel, 1972 (Fair)	3900*
200 diesel, 1972 (Good)	5400
7040 diesel, 1977 (Good)	8000*

OLIVER TRACTORS

70,	100
77, 1950 (Fair)	450*
88,	800
S88,	1125
1755, 1973 (Good)	4600*
1800, 1962 (Fair)	2300
1800 diesel, 1961 (Rough)	1600*
1800, 1961 (Rough)	1300*
1800 diesel, 1961 (Fair)	1700*
1800, 1961 (Fair)	1950*
1850, 1964 (Fair)	1400*
1850, 1965 (Fair)	2500
1850, 1963 (Fair)	2575
1950 T, 1965 (Fair)	4600*
2150 diesel, 1966 (Fair)	4050*

CASE TRACTORS

DC,	200
SC, 1945 (Rough)	375
430, 1965 (Fair)	1150*
730, 1967 (Excellent)	1375
930, 1966 (Good)	1800*
930, 1965 (Fair)	2800*
930 diesel, 1967 (Fair)	2950*
930 diesel, 1968 (Fair)	2000*
1030 diesel, 1969 (Good)	3200*
1070 diesel, 1973 (Rough)	5100*
1370, 1976 (Fair)	8600*
1470 TK, 1972 (Rough)	4650
2090 diesel, 1979 (Good)	12,000*
2670, 1975 (Fair)	10,500*

DEUTZ TRACTOR

50-60, (Fair)	3800*

ENLOW AUCTION CO.
Tulsa, Okla.
Oct. 13, 1984

ALLIS-CHALMERS TRACTORS

WD-45, 1955 (Good)	700
D-15, plow, 1963 (Fair)	1400*
D-17, ldr., 1962 (Fair)	2000*
7000 diesel, cab, 1976 (Good)	7000
7060 diesel, cab, 1976 (Good)	6250

CASE TRACTORS

LA, 1953 (Fair)	275*
VAC, 1954 (Fair)	250
1030 diesel, 1966 (Good)	3250*
530 diesel, backhoe 1963 (Good)	4600

FERGUSON TRACTORS

TE-20, 1948 (Good)	1200
TO-20, 1950 (Rough)	800
TO-30, 1951 (Good)	1475
40, 1957 (Good)	2375

FORD TRACTORS

9N, 1943 (Rough)	650*
9N, 1944 (Good)	1050*
9N, 1944 (Fair)	850
9N, 1945 (Good)	1025
9N, ldr., 1945 (Good)	1150
9N, 1946 (Good)	1075
9N, 1946 (Good)	1350
9N, 1947 (Good)	1500
8N, 1947 (Fair)	1075
8N, 1947 (Good)	1250
8N, 1948 (Good)	1475
8N, 1948 (Good)	1200*
8N, 1949 (Good)	1300
8N, 1949 (Fair)	1075*
8N, 1949 (Good)	1475
8N, ldr., 1950 (Good)	1250*
8N, 1951 (Good)	1525
8N, 1951 (Good)	1300
8N, 1951 (Fair)	1150
8N, 1952 (Good)	1275
NAA, 1953 (Fair)	1550
NAA, 1953 (Good)	1975
NAA, 1953 (Fair)	1575*
NAA, 1954 (Good)	2100
600, 1955 (Good)	2000
641, 1958 (Good)	2150*
641, 1959 (Fair)	1850*
641, 1959 (Good)	2250
801, Select-O-Speed, 1958 (Good)	1650*
841, 1960 (Good)	2400
841, ldr., 1960 (Rough)	1250*
901, Select-O-Speed, 1957 (Good)	1650
Major diesel, 1956 (Fair)	1000
2110, ldr., 1965 (Fair)	2500
3000 diesel, 1968 (Good)	3200
3000 diesel, 1972 (Good)	3400*
3000 diesel, reel mower, 1972 (Good)	4000*
3400 forklift, 1968 (Good)	4150*
4000 diesel, 1967 (Good)	3300*
4000 diesel, 1968 (Good)	3250*
4110, 1966 (Fair)	3000*
4110, 1966 (Fair)	3100*
5000 diesel, 1968 (Good)	3750
8000 diesel, 1967 (Fair)	4250

INTERNATIONAL HARVESTER TRACTORS

Super A, 1950 (Good)	950
Super C, 1953 (Fair)	500
Super C, 1952 (Good)	700*
Cub Loboy, 1967 (Good)	1750*
245 diesel, 1959 (Fair)	1000
344 diesel, 1963 (Good)	1850
354 diesel, 1967 (Good)	3100
384 diesel, 1976 (Fair)	3200*
574 diesel, ldr., 1977 (Good)	5350
674 diesel, 1973 (Good)	4500*
706 LP, 1964 (Fair)	2800*
2400 diesel, backhoe, 1970 (Good)	5000
2404 diesel, ldr., 1969 (Good)	4900
2444, 1965 (Good)	2900
2444 diesel, ldr., 1969 (Good)	4500*
TD-9 diesel, dozer, 1962 (Good)	5450*

JOHN DEERE TRACTORS

70, 1953 (Fair)	850*
2010 diesel, 1961 (Good)	2175
2010 diesel, dozer, 1963 (Fair)	2500
2020 diesel, 1969 (Good)	4550*
3020 diesel, 1969 (Good)	5300
4010 diesel, 1962 (Good)	4050*
4020 diesel, 1968 (Good)	5200
4020 diesel, 1970 (Good)	5850*
2130 diesel, cab, 1972 (Fair)	3500*
302, 1967 (Fair)	2250*
950 diesel, 1981 (Good)	5850
400 diesel, backhoe, 1968 (Good)	4850*

MASSEY-FERGUSON TRACTORS

35 diesel, 1961 (Fair)	1450*
50, ldr., 1959 (Good)	2375
50, 1962 (Good)	2500*
65, 1958 (Fair)	2150
65 diesel, 1958 (Good)	2300
65 diesel, 1960 (Good)	2550*
65, 1961 (Fair)	2300
65 diesel, 1961 (Good)	2700*

(More...)

Auctions *(continued)*

65 diesel, 1962 (Good)	2650
65 diesel, 1963 (Good)	3050
135 diesel, 1966 (Good)	3300
135 diesel, 1967 (Fair)	3000
135 diesel, 1969 (Good)	3500*
135 diesel, 1970 (Good)	3500*
2135, 1968 (Good)	3475
2135, ldr., 1967 (Good)	4100*
150 diesel, 1966 (Good)	3250
150 diesel, 1968 (Good)	3400
165 diesel, 1965 (Good)	3350*
165 diesel, 1965 (Rough)	2525
165 diesel, 1968 (Good)	3425*
165 diesel, 1970 (Good)	3700
175 diesel, 1969 (Good)	3600
180 diesel, 1966 (Good)	3400
180 diesel, 1967 (Good)	3200*
180 diesel, 1967 (Fair)	3025
180 diesel, 1968 (Good)	3700
180 diesel, 1968 (Fair)	3000
245 diesel, 1977 (Good)	5950
245 diesel, 1978 (Good)	5700*
255 diesel, 1979 (Good)	6000
275 diesel, 1976 (Good)	5850*
285 diesel, 1979 (Fair)	6250*
1080 diesel, 1969 (Fair)	3000
1080 diesel, 1969 (Good)	3800
1085 diesel, 1974 (Good)	5700
1100 diesel, 1968 (Good)	3600
1130 diesel, cab, 1967 (Good)	3800
1135 diesel, 1976 (Fair)	4200*
2675 diesel, cab, 1979 (Fair)	7500*
30B diesel, ldr., 1981 (Excellent)	8200
40 diesel, backhoe, 1968 (Good)	5500
6500 diesel, forklift, 1979 (Good)	11,000

MINNEAPOLIS-MOLINE TRACTORS

302, ldr., 1967 (Good)	1850
670, 1966 (Good)	2100*

OLIVER TRACTOR

550, 1960 (Good)	2000

WHITE TRACTORS

4-150 diesel, 1974 (Good)	5750
4-150 diesel, 1974 (Good)	5600*

Wheel Tractors, Attachments and Parts, Value of Shipments, 1979-1983

(in thousands of dollars)

	1983	1982	1981	1980	1979
Wheel Tractors, Farm Type	1,720,680	2,215,466	3,066,418	2,761,480	2,901,693
Wheel Tractors, Non-Farm	95,482	80,404	97,257	115,154	165,506
Attachments for Wheel Tractors, Farm and Non-Farm	10,350	24,037	44,965	48,066	69,353
Parts for Wheel Tractors, Farm and Non-Farm	193,702	246,970	421,320	469,505	255,726
Wheel Tractor Chassis, Shipped as Part of Shovel Loader/Backhoe	396,454	234,388	315,639	306,736	351,306
TOTALS	**2,416,668**	**2,801,265**	**3,945,599**	**3,700,941**	**3,743,584**

Source: U.S. Dept. of Commerce, Bureau of the Census, Current Industrial Reports, Tractors (M35S).

Farm Machinery and Garden Equipment, Attachments and Parts, Value of Shipments, 1979-1983

(in thousands of dollars)

	1983	1982	1981	1980	1979
Planting, Seeding and Fertilizing Machinery	449,458	673,080	802,378	680,743	652,944
Harrows, Rollers, Pulverizers, Stalk Cutters	341,610	360,522	552,491	555,377	601,262
Plows	128,218	151,887	233,199	245,875	273,496
Harvesting Machinery	1,478,203	2,069,585	2,579,889	2,207,075	2,133,516
Haying Machinery	524,708	545,099	711,748	778,199	674,621
Farm Dairy Machines and Equipment	118,543	110,656	159,961	143,372	134,301
Sprayers and Dusters	228,757	257,882	248,491	254,088	245,368
Farm Elevators and Blowers	72,576	112,436	117,986	140,809	173,492
Cultivators and Weeders	136,455	202,153	235,994	275,793	275,519
Machines for Preparing Crops for Market or Use	186,345	282,420	319,425	340,083	384,916
Farm Poultry Equipment	103,706	110,409	144,939	174,931	223,333
Hog Equipment	50,094	41,946	41,530	63,951	120,728
Other Barn and Barnyard Equipment	183,199	202,249	257,298	274,220	306,942
Farm Wagons, Other Farm Transportation Equipment	153,347	172,989	212,087	207,105	276,557
Irrigation Systems	316,896	241,395	349,237	308,974	234,412
Commercial Turf, Mowing Equipment	227,189	199,246	191,147	200,666	119,189
Other Turf, Grounds Care Equipment	39,197	38,543	40,743	35,430	33,008
Consumer Nonriding Lawn, Garden, Snow Equipment	1,337,362	1,283,718	1,167,768	1,374,557	1,444,126
Consumer Riding Lawn, Garden, Snow Equipment	1,061,548	964,550	899,576	953,403	1,047,080
TOTALS	**7,137,411**	**8,020,765**	**9,265,887**	**9,215,006**	**9,354,810**

Source: U.S. Dept. of Commerce, Bureau of the Census, Current Industrial Reports, Farm Machinery and Lawn and Garden Equipment (MA-35A).

Shipments of Farm Machines and Equipment

(in units, 1979-1983)

Type of Farm Equipment	1983	1982	1981	1980	1979
Balers, hay (all types):					
Bales under 200 lbs.	6,681	10,130	15,936	17,065	20,867
Bales over 200 lbs.	18,337	14,302	23,213	32,446	31,443
Blowers (includes forage type, combination grain-forage type)	3,825	3,674	6,771	9,752	11,526
Cabs (metal), farm tractor	16,347	19,674	10,597	10,565	49,259
Cabs, other equipment	3,471	4,739	6,269	4,051	4,648
Combines, grain, pull-type and self-propelled	13,673	22,726	32,062	28,502	32,400
Corn heads	4,368	7,228	17,107	14,601	20,052
Cotton strippers (all types)	NA	NA	NA	2,566	1,279
Cultivators, corn and cotton types	8,510	14,622	25,957	28,726	37,939
Cultivators, field:					
Pull-type	5,599	6,493	9,385	14,897	19,520
Mounted	2,252	2,024	3,044	5,257	4,731
Cultivators, rotary:					
Ground driven, sections and machines	5,041	9,986	15,025	20,355	16,480
Ground driven, integrally mounted					11,466
Power driven			456	486	700
Cultivators and weeders, other	17,238	24,347	30,936	47,727	39,153
Cutters and shredders or rotary mowers (pto):					
Flail-type	17,499	11,451	9,541	12,149	12,747
Horizontal blade-type	84,191	68,433	66,944	75,677	95,045
Diggers, peanut (shakers and windrowers but not combines)	1,055	974	685	1,233	1,847
Combines, peanut			270	880	1,632
Distributors (fertilizer):					
Dry	6,994	7,157	6,129	6,254	11,754
Liquid	6,105	5,952	8,841	10,070	7,196
Anhydrous Ammonia	1,697	3,104	6,094	6,693	7,178
Dryers, grain, hay and seed batch type, pto or electric-motor operated	1,274	4,347	5,413	7,899	9,809
Continuous flow-type	452	835	1,348	1,419	1,755
Heated air units	7,361	22,178	12,553	14,983	21,573
Dusters, power, all types	563	493	859	794	727
Elevators, portable:					
Single chain	2,721	3,307	5,507	7,316	8,224
Double chain	2,218	2,998	3,074	6,680	9,446
Auger-type, under 6-in. dia.	10,255	13,874	17,607	25,725	35,585
Auger-type, 6-in. dia.	6,191	7,891	8,373	27,885	56,809
Auger-type, over 6-in. dia.	10,463	18,354	17,537	23,809	59,658
Elevators, stationary and other	32,762	97,680	89,034	33,268	38,734
Fans, crop drying and aeration	16,558	37,263	27,452	26,162	51,441
Grain drills, fixed-frame, all types	10,043	17,331	21,861	19,448	NA
Grain heads for combines	14,286	24,656	48,656	46,162	50,177
Grinder-mixers, stationary and portable	4,987	4,653	8,031	14,152	18,888
Harrows, disk	23,950	27,448	51,639	67,676	85,375
Harrow sections (spike-, spring-, tine-tooth and power)	42,202	59,404	75,246	96,893	120,695
Harvesters, beet	139	244	289	246	111
Harvesters, forage, field, shear-bar type, self-propelled and pull	4,406	5,316	7,309	12,761	14,006
Attachments for shear-bar type, pickup and cutter-bar hay units	6,500	6,189	8,999	9,785	10,398
Row crop units, all sizes	4,476	5,707	6,857	11,800	13,578
Flail-type, including discharge spouts	951	1,049	2,259	3,062	3,080
Harvesters, potato	302	342	387	258	362
Harvesting machinery, other	3,162	5,031	7,816	8,108	11,972
Levelers or scrapers	4,971	4,089	6,122	6,931	165,346
Loaders, field, for baled hay	2,000	2,929	2,868	6,457	6,890
Loaders, tractor mounted, farm	19,355	17,243	23,322	36,547	69,294
Mills, feed, farm size (includes grinders and crushers of the hammer, burr or roller types	3,334	4,206	6,481	8,035	11,077
Mixers, feed, farm size	2,148	2,293	3,094	3,162	4,108
Mowers, cutter bar-type	4,515	6,550	7,687	8,586	8,435
Mower-conditioners, self- propelled and pull-type	15,048	20,051	31,059	38,071	35,039
Planters, corn and cotton, all types	34,530	108,394	163,096	156,482	NA
Planters, row crop units (quantity in number of rows)					36,887
Plows, chisel or sweep type:					
Pull-type	3,833	4,910	6,738	14,313	15,455
Mounted	2,384	4,061	4,618	6,094	9,703
Plows, disk-chisel combination	4,062	4,105	6,059	3,195	NA
Plows, disk, 1-way, 2-way (harrow, cylinder, great plains, all sizes)	2,360	3,010	4,832	8,302	NA
Plows, subsoiler					8,321
Plows, terracing and ditching	1,057	1,039	1,756	2,383	2,308
Plows, moldboard					
Pull-type, one-way	551	998	2,503	3,263	3,873

(More...)

Shipments *(continued)*

Type of Farm Equipment	1983	1982	1981	1980	1979
Mounted, 1-way	2,460	3,081	6,111	8,680	13,224
Semi-mounted, 1-way	1,541	2,197	11,485	11,817	18,883
Pull-type and mounted, 2-way	1,212	2,262	3,297	2,999	3,577
Plows, other (except snow)	3,706	5,482	4,654	6,111	2,610
Rakes, hay, side-delivery,	7,266	10,089	13,615	19,707	19,121
Sprayers, field and row crop type:					
Power, self-propelled	1,202	2,305	2,010	3,516	4,257
Power, tractor-mounted	17,999	18,589	24,250	25,549	31,089
Power, non-tractor-mounted	4,937	5,197	8,898	14,089	16,810
Sprayers, power, not field or row crop type	5,246	6,660	6,203	7,444	6,896
Sprayers, power, air-carried	4,436	5,742	6,996	6,286	9,856
Spreaders, manure:					
Conveyor type	9,177	9,067	11,802	17,029	16,586
Tank type	2,274	2,533	4,540	7,188	8,772
Stackers, throwers, for hay	3,259	3,722	8,584	1,175	1,806
Tillage equipment, combination roller/harrows, disk or coulter, field cultivators, disk or coulter/spring tooth	3,238	3,325	6,356	8,193	8,527
Tool bars, basic units, pull, mounted	1,267	3,446	4,416	4,277	7,246
Tractors, tracklaying type	7,247	7,159	15,789	18,208	19,812
Tractors, wheel					
Farm type	45,966	64,784	118,209	118,240	159,973
Non-farm type	5,924	5,323	7,480	10,029	18,452
Transplanters and broadcast seeders	17,298	21,308	23,854	20,872	43,672
Wagons, farm type, chassis only, and trailer gear	26,858	24,880	42,249	46,642	53,247
Wagon boxes and racks for mounting on wagons and trailer gear					
Manual unloading or dump	10,454	9,675	14,621	16,998	23,342
Gravity unloading, grain type	5,807	9,361	13,506	24,028	39,377
Power unloading	10,040	10,310	14,864	18,038	19,950
Wagon boxes with integral running gear	2,828	3,385	5,559	5,737	8,136
Windrowers for grain, pull-type	502	848	NA	828	819
Windrowers for hay, self-propelled	NA	NA	NA	7,163	5,841

In some cases, I&T has combined data because of space limitations. If you need more information from MA-35A, write us.
DATA: Current Industrial Reports, Series MA-35A, Bureau of the Census.
NA – Not available or not applicable.

Industry in Motion

The **Farm Equipment Div., Lear Siegler Inc.**, Wahpeton, N.D., has appointed John P. Kehrwald as vice-president, engineering.

Denny Turnwald has been named farm show manager for **Unverferth Mfg. Co., Inc.**, Kalida, Ohio.

Mid-West Co., Burr Ridge, Ill., has appointed Fred Bolling as vice-president, sales.

Farmhand, Inc., has moved its corporate offices from Hopkins, Minn., to 6421 Hazeltine Blvd., Excelsior, Minn. 55331, phone 612-474-1941. Farmhand's manufacturing facilities are located in Grinnell, Iowa.

Rexnord has purchased the assets of **Canadian Adhesives, Ltd.**, for an undisclosed amount of cash. Canadian Adhesives is a Montreal-based manufacturer and marketer of adhesives, sealants, waterproofing and wood preservative products for the industrial and consumer market. It will become part of Rexnord's chemical products business.

Pearson Bros., Galva, Ill., manufacturer of tanks, liquid manure spreaders, pumps, and liquid fertilizer injection applicators, has been bought by Gerald Gidwitz, who has renamed the firm **Pearson Co.** James Stearns is new president and CEO, James Shook is administrative vice-president, Wayne Powell heads marketing and Harry Knuppel manages manufacturing. The company has opened a perforated metals division and purchased a seed cleaner line.

Brillion Iron Works, Brillion, Wis., a unit of Beatrice Co., Chicago, Ill., will be sold to **Robins Group**, San Diego, Calif., for $32.5 million, according to a signed letter of intent.

Parker Hannifin Corp., Cleveland, Ohio, has purchased GNP/K-LON Corporations, Illinois-based manufacturers of PTFE (Teflon) sealing devices, for approximately $4 million cash.

Don Jorgensen is new president of **Kuker Industries**, Omaha, Neb., and Jim Weaver is new national sales manager.

Fred Rollins has been named to head up new market development for **Rome Industries**, Cedartown, Ga.

Donald F. Lomen is the new marketing services manager for the **Portable Elevator Div., Dynamics Corp. of America.**

Charles M. Stomieroski has been appointed director of marketing for **Waukesha Engine Div., Dresser Industries**, Waukesha, Wis.

One of the winners of the 1984 Peat Marwick/*Crain's Illinois Business* High Tech Entrepreneur Awards is **Robert C. Lanphier, III, Dickey-john Corp.**

Dave Richards has been appointed technical representative in Washington, Montana and areas of Idaho by **Parker Hannifin Fluidpower Group.**

Bunton Co., Louisville, Ky., and **Deere & Co.**, Moline, Ill., have reached an agreement under which Deere acquires a 20 per cent interest in Bunton. A privately-held firm, Bunton manufactures commercial mowers in the 24- to 61-inch range.

ITALIAN EQUIPMENT ON THE U.S. MARKET: A GROWING PRESENCE

Commerce Dept. statistics reveal strong increase in imports from that country.

BULLETIN:

According to latest data from the U.S. Dept. of Commerce, imports of farm equipment, including tractors and parts, came to $125 million in the first nine months of 1983, establishing a new record. The previous record was $101 million for the full year of 1981.

■LET'S take a look at the Italian presence on the U.S. farm equipment scene. We've got some interesting numbers, thanks to import statistics from the U.S. Dept. of Commerce's Office of Capital Goods.

The United States has been a good market for Italian farm equipment for many years, and it is apparent that the market is growing.

In 1975, farm equipment imports from Italy came to $33 million. They have been moving up since then, though never in a straight line, hitting $78 million in 1979 and floating between $95 million and $101 million in the following four years.

And in the first half of this year, imports from Italy took another upward jump, topping $78 million. Unless activity has fallen off drastically in the last half of this year, a new record will have been set.

What products head the list? Top of the line by far is tractor parts—$41 million in 1982, $51 million in 1983 and $47 million in the first half of this year. This level of supply suggests that over the years, Italian component makers have established a substantial place for themselves among U.S. manufacturers.

In addition, American manufacturers have, over many years, imported substantial quantities of complete tractors from Italy, which have been branded and marketed as

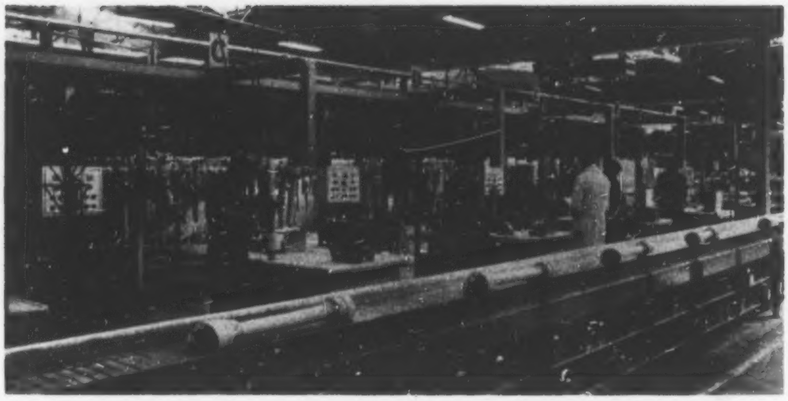
(More...)

TRACTOR IMPORTS FROM ITALY Jan., 1980 to June, 1984

Year	Under 20 HP	20-29 HP	30-39 HP	40-79 HP	80-99 HP	Over 100 HP	Total Ag Wheel Tractors	Others, incl. garden, rototiller types	Total Tractor Value in Thousands
1980	33	31	211	2,011	55	189	2,530	727	$25,984
1981	134	10	632	1,839	430	341	3,286	173	36,304
1982	26	19	372	1,399	369	863	3,048	69	42,702
1983	55	35	67	1,598	357	236	2,338	2,805	28,123
1984*	60	...	27	882	339	30	1,338	150	14,198

*First six months.

Source: U.S. Dept. of Commerce, International Trade Administration, Office of Capital Goods and International Construction



The universal joint was first developed by a 16th Century Italian, Gerolamo Cardano. Bondioli & Pavesi of Suzzara, Italy, has become an important supplier of ag drive shafts from this plant to North America.

part of the company's line. Allis-Chalmers and Oliver (now White) are examples. Replacement parts for these units regularly go into the manufacturers' distribution systems.

Tractors

But until recent years, not many Italian tractors were seen in the U.S. under their own colors. SAME & Lamborghini, a world pioneer in front-wheel drive and air-cooled diesel engines in tractors, opened an office in New York and began building a market in the 1970s.

Hesston, which became a partially owned subsidiary of Fiat, the Italian industrial giant, in 1977, introduced the Fiat tractor line in 1981. The brand on current models is Hesston Fiatagri.

Massey-Ferguson acquired Landini in 1960 and has used it as a supplier of some models for its North American markets under MF colors. In 1982, MF established a special sales office at Columbus, Ohio, to sell Landini tractors, branded as such, through the MF system on a different contractual basis.

Take a look at the table. It shows what has been happening with regard to Italian tractor imports over a 54-month span. For instance:

Inflow of tractors over 100 horsepower jumped substantially between 1980 and 1982 as Hesston began filling its pipelines with the Fiat line. But the well-documented buildup in industry inventories of big tractors suggests that orders have been cut back in that horsepower area.

Italian tractor sales in the U.S. focus on the 40-to-79 horsepower group. The rate of imports for these sizes has ranged from 1,400 to 2,000 units a year through the 1980s. If the marketers of these Italian tractors have been able to keep retail sales up with import levels, they have been getting about a 4.4 to 5.2 per cent share of market over the 30 months ending last June 30.

Dollar value of tractor imports from Italy to the U.S. peaked at $42 million in 1982 as the flow of big tractors was high. The total fell by a third last year as importers cut back on big tractors while moderately increasing the inflow of medium sizes. Also last year, 2,805 units classified as including garden and rotary tiller types came in, but these averaged under $1,100 in value, according to the Commerce Dept. data.

In the first half of this year, the movement of big tractors had declined sharply—to 30 units—but total value of tractor imports was holding steady.

Other farm equipment

If you subtract tractors and tractor parts from the total of Italian imports, you get a modest but increasing level of activity: $12 million in 1982, $20 million in 1983 and $16 million the first half of this year.

Unfortunately, government import numbers are not as thoroughly broken down for types of farm equipment as they are for tractors. The bulk of the $16 million in such imports in the first half of this year are thus described as "agricultural machines not elsewhere specified ($4.2 million)" and parts for such unspecified machines ($5.4 million).

By observation, it seems to I&T that these numbers contain such items as small air-cooled diesel engines for agricultural use, powered tillers, horticultural lines, and specialized orchard and vineyard equipment. I&T

Typical application of Italian componentry on U.S. equipment: An 18.5-hp diesel, built by Lombardini for Briggs & Stratton, powers this Allis-Chalmers garden tractor.

C4725-1

TWO DOLLARS

Implement & Tractor

The business magazine of the farm and industrial equipment industry

JANUARY 1985

Finding Time for Management Decisions page 32

Understanding Those Nebraska Tests

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&Tractor

The business magazine of the farm and industrial equipment industry.

January 1985 • Vol. 100 • No. 1

20th Engineering Concepts Issue

The Nebraska Tests

8: **What Are The Tests? How Are They Used?** The first piece in a five-part series that takes an in-depth look at the tests that are accepted as the worldwide standard for tractor comparison.

10: **How to Read a Nebraska Test.** Using a test report as an example, author Frank Buckingham shows the key data from an actual report.

22: **New Tractors from Case and Versatile.** A look at introductions for the 1985 model year from two manufacturers.

32: **Finding Time to Plan for Tomorrow.** Our Management Modes series examines how long-range planning is worked into the operation of Baldridge Equipment in Colorado Springs, Colo.

34: **The Rumor Mill that Tenneco Built.** Some observations on problems Tenneco created for itself in announcing the planned merger of J I Case and International Harvester's ag division.

DEPARTMENTS

I&T Update....................4
Editor's Notebook.............6
What's New....................24
Auction Prices................28
Industry in Motion............33
Brown Pages...................37
Classified Ads................42
Index to Advertisers..........42

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I&T Update

November Cleanup: Sales of Most Product Groups Went Up

Pushes to reduce inventory were strong in November, as indicated by the flash report of the Farm & Industrial Equipment Institute. Tractor unit volume was up in all categories except four-wheel-drive models. Combines and other implements were also reported up sharply.

Unit Retail Sales

	November			January-November		
	1984	**1983**	**Pct. Change**	**1984**	**1983**	**Pct. Change**
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	3,133	2,905	+ 7.8	47,724	43,578	+ 9.5
40-99 hp	2,671	2,523	+ 5.9	35,504	35,541	− 0.1
100-139 hp	812	748	+ 8.6	9,087	13,665	−33.5
Over 140 hp	1,494	1,471	+ 1.6	13,765	12,715	+ 8.3
Total 2-wheel drive	**8,110**	**7,647**	**+ 6.1**	**106,080**	**105,499**	**+ 0.6**
4-wheel drive						
Under 200 hp	79	144	−45.1	1,345	1,842	−27.0
Over 200 hp	145	315	−54.0	2,219	2,783	−21.3
Total 4-wheel drive	**224**	**459**	**−51.2**	**3,564**	**4,625**	**−22.9**
Total All Tractors	**8,334**	**8,106**	**+ 2.8**	**109,644**	**110,124**	**− 0.4**
S-P Combines	1,793	1,271	+41.1	10,544	11,548	− 8.7
Balers (under 200-lb. bales)	334	224	+49.1	8,113	8,866	− 8.5
Forage Harvesters (shear-bar type)	294	205	+43.4	3,379	3,949	−14.4
Mower-Conditioners	493	302	+63.2	12,709	13,834	− 8.1

MF Made a Profit In 3rd Period

Massey-Ferguson Ltd. reported a net profit of $4.4 million (U.S.) in the third period of fiscal 1984 (ended Oct. 31) compared with a loss of $11.9 million a year earlier. Nine-month income was $14.2 million on sales of $1.131 billion; a year before, sales were $1.173 billion and losses $41 million.

Fourth quarter sales this year were $359 million, down 2.7 per cent. In North America, sales were $133 million for the quarter (off 6.7 per cent) and $411 for the year to date, up 3.7 per cent.

Deere's '84 Sales: $4.4 Billion, Up 11%

Deere & Co. sales for fiscal 1984, ended Oct. 31, hit $4.399 billion, up 11 per cent from 1983's $3.968 billion. Net income was $105 million, compared with $23 million in 1983. In the fourth quarter, net income was $34 million; in the same 1983 period, it was $58 million. Fourth quarter volume was $1.232 billion, up 12 per cent from 1983's $1.102 billion.

Deere has announced its intention to cut worldwide production in 1985 to slightly below its 1984 output; in North America, schedules for farm equipment are below the level of estimated 1985 retail sales and "significantly lower than actual 1984 output."

Worldwide farm equipment sales were $3.5 billion, up 6 per cent; industrial equipment sales went up 37 per cent to $894 million.

Trade receivables (mostly dealer inventories) ended the year at $2.847 billion, compared with $2.724 billion a year earlier.

Amerequip Is Formed From 3 Shortliners

Three shortline farm/industrial equipment companies have been consolidated as Amerequip Corp., owned by an investor group headed by Richard H. Lytle and based in Chicago.

The companies are Arps Mfg., Inc., New Holstein, Wis.; Schwartz Mfg., Inc., Sioux Falls, S.D., and Lester Prairie, Minn.; and Brantly Mfg. Co., Frederick, Okla. They will continue to operate as separate manufacturing units, according to Lytle.

The Lytle group acquired Arps in the first quarter of 1983, Schwartz late in 1983 and Brantly in early 1984.

Briefly...

Construction equipment distributors have predicted a 10 per cent increase in gross sales for the first half of 1985, according to Associated Equipment Distributors, Oak Brook, Ill. In 1984's first nine months, the group's gross sales were up 26 per cent over 1983. Item forecasts: wheel loaders, loader-backhoes, pavers, compaction equipment, up a median 10 per cent; hydraulic excavators, portable generators, up 12.5 per cent; pumps, up 14.5 per cent.

Deere & Co. is transferring administrative sales functions of its Memphis branch to branches in Dallas and Atlanta, keeping the parts and wholegoods warehouse.

November in Canada: More Inventory Cuts

Retail sales of tractors were also strong in Canada, according to the Canadian Farm & Industrial Equipment Institute. For November, unit volume went up 77 per cent to 1,817 units. For the year, tractor volume is down 2.4 per cent at 16,259.

Canadian self-propelled combine sales went up 27 per cent in November—216 units; 11-month combine volume was off 8 per cent at 2,486 units.

Brazilian Tillage Tool Imports Under U.S. Investigation

The U.S. Dept. of Commerce is investigating imported tillage equipment from Brazil to determine if "upstream subsidy" provisions of a recently passed U.S. law have been violated.

Earlier, the Commerce Dept.'s International Trade Administration had been petitioned by three U.S. manufacturers, Ingersoll Products Corp., Chicago, Ill.; Empire Plow Co., Cleveland; and Nichols Tillage Tools, Inc., Sterling, Colo., claiming that they had been materially injured by Brazilian tillage equipment imports as a result of subsidies as defined under U.S. law.

The ITC has said that the petition contained sufficient grounds on which to initiate a countervailing duty investigation. The petitioners alleged that Brazilian manufacturers and exporters receive an upstream subsidy through the purchase of subsidized inputs of steel as well as subsidization of exports.

The Brazilian firms named in the petition as producing and exporting the tillage equipment alleged to be subsidized are Baldan Implementos Agricolas, S.A., Matao; Marchesan Implementos E. Maquinas Agricolas Tatu S.A., Sao Paolo; Pirantininga Implementos Agricolas S.A., Passo Fundo; and Metisa Metalurgica Timboense S.A., Timbo.

The Commerce Dept. has stated that it will make its preliminary determination in the matter June 4.

Can Parts Produce Profit?

Parts managers from FIEI companies were challenged at the latest parts conference to lower their operating costs to enhance their contribution to corporate earnings.

By Scott R. Nesbitt

■LIKE THEIR dealers, farm equipment manufacturers are finding the parts department is the last great hope for making a profit.

That was the major theme sounded during the fifth annual FIEI parts committee meeting, Nov. 6-9, in Kansas City.

"Parts distribution costs are too high by 10 per cent of the sales dollar," declared James R. Davis, an analyst with Herbert W. Davis & Co., the distribution consultants who maintain the FIEI parts committee survey and data base.

"This means if your organization does $100 million a year in parts, you could bring in an extra $10 million in profit. That could mean 2½ per cent of total company revenue. That kind of contribution to corporate performance could bring you to stardom," Davis told the 100 assembled parts managers from all segments of the farm and industrial machine business.

Comparative Operating Costs

FIEI companies versus industrial parts and transportation equipment parts companies

	FIEI	Ind. Parts	Trans. Equip. Parts
Percent of Annual Net Sales			
Transportation – internal	1.82	1.61	1.14
Transportation – to customers	1.28	3.17	2.10
Warehousing	7.44	1.67	2.88
Customer service	1.86	0.98	0.93
Administration	3.65	0.28	0.83
Inventory carrying	8.50	2.46	3.95
Packing & identification	0.97	0.28	1.03
Total Percent of Sales	25.52%	8.64%	10.57%
Cost Per Hundredweight			
Transportation – internal	$ 8.86	$ 3.42	$ 3.01
Transportation – to customers	5.37	11.02	6.17
Warehousing	33.91	10.63	9.21
Customer service	9.20	12.90	3.96
Administration	16.43	3.35	2.67
Inventory carrying	41.99	33.93	13.32
Packing & identification	3.85	0.48	3.56
Total Costs	$119.61	$71.71	$34.70
Volumes			
Thousand CWT	265	673	318
Million sales $	90	157	88
Average Sales $/lb.	4.56	8.81	3.34
Average number of plants & warehouses	6	4	3
% Delivery paid by customer	64	8	24

Total Costs Are Not Additive

Source: Herbert W. Davis & Co., FIEI Parts Committee 1984 physical distribution data base report.

Like other speakers at this and previous conferences, Davis criticized the traditional farm industry approach to serving customers' demands immediately.

"You don't want to make your customer ecstatically happy," Davis summarized, "you just want to keep him satisfied."

The Davis report on distribution confirmed the findings of previous reports – service to customers is very good, and costs of doing business that way are too high.

Davis said there was some problem with comparing 1984 data with that of previous years because only half the 1984 participants were contributors in 1983. This makes it hard to measure change in the performance of the industry between those two years.

Comparability of data for the FIEI farm equipment division was good because almost all 1983 respondents also joined the 1984 survey. It was changes in participation in the other two divisions that skewed the results for the overall industry survey.

Costly comparisons

To show how traditional policies have cut parts profitability of FIEI member companies, the Davis report drew comparisons of the FIEI data against roughly comparable industries – industrial parts and transportation equipment – where end users demand rapid parts service, and where something akin to the same distribution network exists.

For the FIEI, the report says, distribution costs ate 25.52 per cent of net annual sales, compared with 8.64 per cent for industrial parts and 10.57 for transportation equipment. On the basis of cost per hundredweight shipped, the FIEI companies spent $119.61, against $71.71 for industrial parts and $34.70 for

(Continued on page ME-9)

Parts Profits

(Continued from page ME-2)

transportation equipment.

"There are some obvious differences in the nature of the things you ship, and the geographic spread of your customers, but the comparison is still highly valid," Davis said.

Davis said the 1984 survey data showed the FIEI Farm Equipment Division (FED) had higher operating costs than the Industrial-Construction Equipment Div. (ICED) and the Agricultural Equipment Div. (AED), but even the best of those divisions did not match operating efficiency of some non-FIEI industry groups.

"You have a greater average number of facilities (parts) warehouses) than any but the grocery industry," Davis said.

"The targets are apparent. First, you need a reduced number of warehousing locations, to get decreased warehouse expense and decreased cost of inventory. Second, you need a reduced level of customer service and administrative costs."

The 1984 survey data show that when the number of warehouses goes down, turnover goes up. One company with 18 warehouses had less than one turn per year, while another with four warehouses achieved three turns per year.

Another portion of the survey shows that warehouse cost as a per cent of sales dollar drops as the number of shipping points drops.

In both those survey sections, though, there were some companies that bucked the general trend, particularly in the cost-versus-number of shipping points study.

Call for less service

Davis told the parts managers they must reduce the level of customer service and the associated administrative costs, and noted that FIEI member companies have higher costs for service than any other industry Davis & Co. studies.

The same note was sounded by keynote speaker David Koentopf, president of Steiger Tractor, who said, "We in the agricultural parts business feel we have to serve the customer's needs at all costs, and that gets very expensive."

Davis called on the managers to rationalize parts distribution in terms of contribution to profits, market share, and long-range corporate objectives.

"The renewal parts distribution strategy of the typical company is becoming more recognized and visible to general management," Davis said. "There is a growing revenue share from renewal parts operations, and a realization of the potential improvement in profit contribution by the renewal parts functions.

"There is growing management realization that service parts response to customer service requirements is vital to the success of future equipment placement."

The result of this growing awareness, he said, is a tendency to adopt a "proactive" response to parts, rather than a "reactive" strategy.

"The industry has tended to go on history, fiat, or other themes that might not necessarily be what's needed for the company. What is needed is a distribution and marketing review of practices that bear upon both distribution cost and service, and development of distribution/logistics strategies in time frames, for the short term, the intermediate future, and the long range."

The long range goal, he said, should be an effective system that has flexibility to respond rapidly to changing market needs.

The big questions

In concluding his statistical report, Davis posed a number of questions to be considered by the parts managers and their corporate bosses.

"Are there company strategies to retain or gain share of the parts market?" he asked, noting that the share of the replacement parts dollar held by OEMs may be as low as one third of total volume.

"If distribution costs are too high by 10 per cent of the sales dollar, may this lead to pricing basic parts at a disadvantage?

"Something like 60 per cent of OEM parts are purchased. Is there, in your company, a value sourcing program to allow competitive pricing at the retail level?

"In general, are you applying industrial engineering to the practices and procedures of your parts operation? Are the things you do paying off?"

New Literature

Brochure WIC-003-84 describing the Wichita Mechanical Power Take-Off, which transmits and disconnects power from industrial heavy-duty diesel engines, is now available from the **Power Transmission Sales Div., Dana Corp.**

Write In (70) on Reply Card

Linde BMF fixed displacement, bent-axis piston motors are described in catalog H-93 from **Commercial Shearing, Inc.**

Write In (71) on Reply Card

Leeson Electric Corp.'s expanded line of Farm Duty Motors is described in a bulletin now available.

Write In (72) on Reply Card

Dynapower Corp. has published a brochure covering its Locveyor belt/pulley tracking system.

Write In (73) on Reply Card

Hansen Coupling Div., Tuthill Corp., has issued its catalog #84-3 of one-way shut-off couplings, which includes a reference guide for coupling selection.

Write In (74) on Reply Card

Eaton Corp., Axle & Brake Div., has released a new parts publication (EB-74) on its 12,000 through 22,000-lb. non-driving steer axles.

Write In (75) on Reply Card

Custom molded parts that can withstand temperatures to 500°F are described in a brochure issued by **Disogrin Industries Corp.**

Write In (76) on Reply Card

Gilian Instrument Corp. is offering a brochure describing a series of modular air pumps for typical air and mixed gas usage.

Write In (77) on Reply Card

Nichols Portland Div., Parker Hannifin Corp., is offering a comprehensive technical handbook describing gerotor advantages in fluid transfer applications.

Write In (78) on Reply Card

USE I&T's HANDY REPLY CARD

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

YODER & FREY, INC.
Archbold, Ohio
November 13, 1984

FORD TRACTORS

8N, 1952 (Fair)	1175
8N, 1948 (Rough)	1175
8N, 1947 (Rough)	1100*
8N, 1947 (Rough)	875
8N, 1952 (Fair)	1350
9N, 1941 (Rough)	700*
9N, 1940 (Rough)	1300*
9N, 1941 (Rough)	1100*
9N, 1940 (Rough)	1050
9N, 1941 (Rough)	700*
9N, ldr., 1942 (Rough)	1175*
9N, 1941 (Rough)	600*
NAA, 1953 (Fair)	1850*
600, 1957 (Fair)	2750
800, 1956 (Rough)	1575
800, 1957 (Rough)	2300
600, 1955 (Good)	1970
871, 1957 (Fair)	1300*
860, 1957 (Fair)	2200
Jub., 1954 (Rough)	1625*
Jub., 1954 (Rough)	1700
Jub., ldr., 1953 (Fair)	1675*
3000 diesel, 1964 (Rough)	2775
4000, 1966 (Rough)	2400
4000, 1965 (Rough)	1650*
4000, ldr., 1965 (Rough)	3200*
5000 diesel, 1971 (Good)	4700*
5000 diesel, 1966 (Good)	3750*
7000 diesel,	6800
8000, 1972 (Fair)	3700*
8000 diesel, 1973 (Fair)	4200
8000 diesel, 1972 (Rough)	4100*
8000 diesel, 1971 (Rough)	5100*
9700 diesel, 1978 (Excellent)	12,000*
4600, ldr.,	7400
860, 1957 (Fair)	2100

CASE TRACTORS

600, 1958 (Rough)	925*
830 diesel, 1965 (Rough)	950
875, 1975 (Good)	3700*
930 diesel, 1966 (Fair)	2500*
930 diesel, 1964 (Fair)	2900
1030, 1969 (Fair)	3700
1030, 1968 (Good)	3300
1070 diesel, 1971 (Fair)	4200*
1070 diesel, 1972 (Rough)	5000
1070 diesel, 1971 (Fair)	8250*
1175 diesel, 1974 (Fair)	5400
1370 diesel, 1975 (Fair)	8250*
2290 diesel, 1978 (Good)	15,000*
2670, (Rough)	10,250*
2670 diesel, (Fair)	11,750*
2670 diesel, (Fair)	10,250*

DAVID BROWN TRACTORS

950, 1965 (Rough)	550*
990, 1967 (Fair)	1950
1200 diesel, 1968 (Fair)	2800*

JOHN DEERE TRACTORS

A, 1947 (Rough)	450*
A, 1946 (Rough)	150
G, 1950 (Fair)	510*
LA, 1949 (Fair)	700
70, (Fair)	525
300, (Fair)	2800*
620, 1958 (Fair)	1300*
720, 1957 (Rough)	1050
730 diesel, 1957 (Fair)	2400*
820, 1959 (Fair)	2500
2020 diesel, 1971 (Rough)	2200
2030, 1975 (Good)	4525
2440 diesel, 1979 (Good)	5550
2940, 4WD, 1980 (Fair)	13,850
3010, 1964 (Fair)	2500*
3010 diesel, 1963 (Fair)	3400*
3010, 1964 (Fair)	3100*
3020 diesel, 1968 (Fair)	5500*
3020 diesel, 1965 (Fair)	4250*
3020, 1967 (Good)	4200
4000 diesel, 1968 (Fair)	6200*
4010 diesel, 1963 (Fair)	3100*
4010 diesel, ldr., 1964 (Good)	4450
4020, 1966 (Fair)	4500
4020 diesel, 1967 (Rough)	4100
4020 LP, 1968 (Rough)	2750*
4020 diesel, 1966 (Fair)	5600*
4020 diesel, 1966 (Good)	6500
4320 diesel, 1973 (Good)	8800
4430 diesel, 1975 (Fair)	7500*
4620 diesel, 1973 (Good)	8000
5020 diesel, 1970 (Good)	8000*
2950, 1983 (Excellent)	14,000

FERGUSON AND MASSEY-FERGUSON

TO-30, 1951 (Fair)	1050*
20, ldr.,	3550
50, 1963 (Fair)	1870
50 diesel, 1960 (Fair)	2000*
65, 1963 (Fair)	1475
65, ldr., 1961 (Rough)	1700*
65, cult., 1964 (Fair)	1950*
65 diesel, 1962 (Fair)	2450*
65, 1962 (Fair)	2050
85, 1964 (Rough)	1035
85,	810
90 diesel, 1963 (Rough)	1150*
165 diesel, 1974 (Fair)	3000
165, 1972 (Fair)	3600*
175, 1971 (Fair)	4050
180 diesel, 1968 (Fair)	2700*
1085 diesel, 1976 (Rough)	5300*

(More...)

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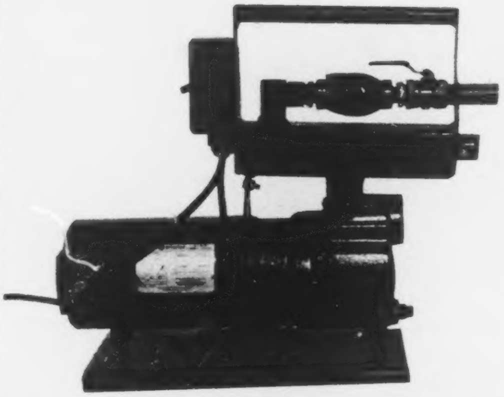

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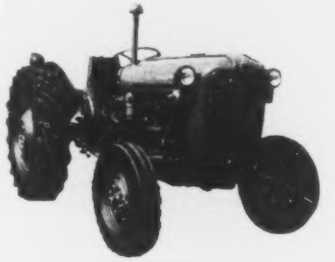

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Auctions *(continued)*

1085 diesel, 1975 (Fair)	5750
1100 diesel, 1971 (Rough)	2500*
1105 diesel, 1976 (Fair)	6500*
1135 diesel, 1975 (Fair)	6000*
1150 diesel, 1966 (Rough)	3000
1800, (Rough)	6250
1805 diesel, 1977 (Fair)	9300
2705 diesel, 1979 (Fair)	9500*
2705 diesel, 1978 (Excellent)	11,500*

INTERNATIONAL HARVESTER TRACTORS

Sup MD, 1951 (Rough)	525
Sup. A, 1950 (Rough)	1000*
Sup. C, 1952 (Rough)	665
H, 1949 (Fair)	590
H, 1944 (Fair)	450
H, 1952 (Fair)	575*
H, 1947 (Fair)	375*
M, 1947 (Fair)	650
M,	510
M, 1940 (Rough)	530
M, 1950 (Good)	1250
M, 1943 (Rough)	650*
Sup. M, 1952 (Rough)	900*
Sup. M,	750
W6, 1949 (Fair)	500
200, 1956 (Fair)	1150*
200, 1956 (Fair)	1450*
300, 1955 (Rough)	950*
300, 1954 (Fair)	750*
340, 1960 (Fair)	1125
340, 1960 (Rough)	1300*
340, 1961 (Fair)	750
460,	975
460, 1959 (Fair)	1200*
434 diesel, 1967 (Rough)	1600*
560, 1960 (Rough)	1600*
544, ldr., 1970 (Fair)	5200
574, 1975 (Fair)	4200
656, ldr., 1970 (Good)	4500*
656, 1970 (Rough)	3500*
656, 1969 (Rough)	4150
684 diesel, 1976 (Fair)	4500*
706, 1963 (Fair)	2800*
706 diesel, 1964 (Fair)	3100*
756, 1968 (Good)	6200*
756, 1970 (Good)	3300
806, 1965 (Fair)	3900
806, 1966 (Rough)	2100
856 diesel,	6250
856 diesel, 1969 (Fair)	3900*
966 diesel, 1974 (Fair)	6750*
986, 1975 (Good)	7300*
986, 1977 (Good)	11,250*
986, 1979 (Good)	10,500*
1066, 1972 (Good)	7500*
1066, 1974 (Fair)	7100*
1066, 1974 (Fair)	7600*
1066, 1976 (Fair)	8100*
1066, 1974 (Fair)	7100*
1086, 1978 (Fair)	12,000
1086, 1978 (Good)	11,250*
1206, 1966 (Fair)	5750
1206, 1965 (Fair)	4750*
1256, 1970 (Good)	6000*
1456, 1970 (Fair)	5600*
1456, 1968 (Fair)	5400*
1466, 1974 (Good)	8000*
1466, 1971 (Good)	7100*
1486, 1979 (Good)	13,500*
1566 diesel, 1975 (Fair)	6500

WHITE TRACTORS

2-105 diesel, (Rough)	6000*
2-105, (Good)	7800*
2-155 diesel, 1979 (Fair)	13,250*
4-150, (Fair)	9000*

MINNEAPOLIS-MOLINE TRACTORS

445 diesel, 1962 (Rough)	650*
UB,	130

COCKSHUTT TRACTORS

30, 1946 (Rough)	300

DEUTZ TRACTORS

D5006 diesel, (Rough)	3500*

ALLIS-CHALMERS TRACTORS

B,	400
D17, 1965 (Fair)	1700
175, 1974 (Good)	3000
190, 1965 (Rough)	2300*
190XT diesel, 1970 (Fair)	3700
200, 1971 (Good)	5200*
210, 1971 (Fair)	4300*
180 diesel, 1970 (Fair)	3000*
7030 diesel, 1976 (Fair)	6550*
7040 diesel, 1976 (Fair)	8000*

OLIVER TRACTORS

77, ldr.,	370
66, 1947 (Rough)	375*
55, ldr., 1954 (Fair)	1225
1600, 1962 (Fair)	2000*
1650 diesel, 1967 (Rough)	2400*
1750 diesel, 1965 (Fair)	3250
1755 diesel, 1973 (Fair)	3900*
1800, 1961 (Rough)	1375
1800 diesel, 1962 (Fair)	2000*
1850 diesel, 1965 (Fair)	3400
1855 diesel, 1972 (Fair)	5200*
1950-T diesel, 1967 (Fair)	4300*
1955, 1972 (Rough)	4500*

MASSEY-HARRIS TRACTORS

44,	410
44, 1947 (Rough)	325

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ALLIS-CHALMERS TRACTOR

7045 diesel, 1978 (Good)	8000

CASE TRACTOR

430, 1965 (Good)	1650

DAVID BROWN TRACTORS

990 diesel, 1972 (Good)	2125
990 diesel, 1966 (Fair)	925

MASSEY-FERGUSON TRACTORS

1135 diesel, 1975 (Fair)	4000*
1105 diesel, 1975 (Fair)	4250
1100 diesel, 1970 (Fair)	2700
1100 diesel, 1968 (Fair)	2400*
1085 diesel, cab, 1975 (Good)	4200
285 diesel, 1975 (Good)	6100*
285 diesel, 1975 (Fair)	4100
245 diesel, 1979 (Good)	5400
230 diesel, 1976 (Excellent)	4100
3165 diesel, ldr., 1967 (Fair)	3000
165 diesel, 1974 (Fair)	3450
165 diesel, 1968 (Fair)	2400*
165 diesel, 1966 (Rough)	1875
135 diesel, 1972 (Good)	3550*
135 diesel, 1972 (Excellent)	3900*
135, 1972 (Excellent)	4000
135 diesel, 1971 (Good)	3200*
135, 1968 (Rough)	1500*
135 diesel, 1968 (Good)	3300
135, 1967, (Good)	3100*
65 diesel, 1961 (Fair)	1100
65 diesel, 1963 (Good)	1800
35, 1962 (Good)	1600*

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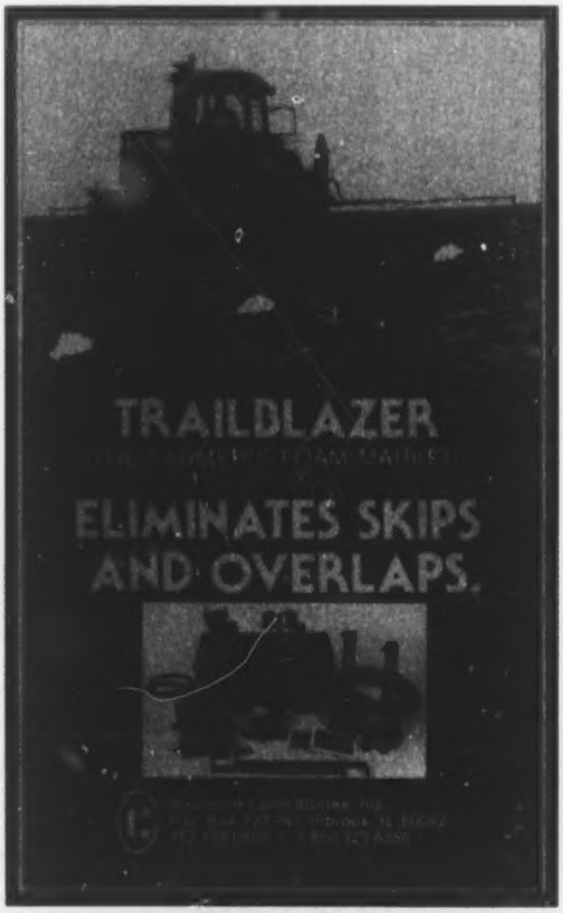

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35, 1959 (Excellent)	2300
TO30, 1953 (Excellent)	1675
TO30, 1952 (Good)	1200

FORD-FERGUSON TRACTORS

9N, 1945 (Good)	1050
9N, 1945 (Good)	1150
9N, 1945 (Good)	1150
9N, 1944 (Good)	900
9N, 1944 (Good)	925*

FORD TRACTORS

9700 diesel, cab, 1977 (Good)	8600*
7000 diesel, 1971 (Good)	4700*
7000 diesel, 1971 (Good)	5000
5000 diesel, Select-O-Speed 1967 (Fair)	3300
5000 diesel, 1966 (Fair)	2900
5000 diesel, 1966 (Fair)	3250*
4600 diesel, cab, 1976 (Fair)	3700
4600 diesel, cab, 1976 (Fair)	3450
4000 diesel, 1966 (Rough)	2000
3000 diesel, 1970 (Good)	3400
3000 diesel, 1969 (Good)	3200
2000 diesel, 1967 (Excellent)	3950
2000, 1970 (Good)	3250
850, 1955 (Good)	1800
850, 1955 (Good)	1825
850, 1955 (Fair)	1350
641, 1958 (Good)	1600*
641, 1958 (Good)	2000
641, 1958 (Good)	1700
Jub., 1953 (Fair)	1475
Jub., 1953 (Rough)	650
Jub., 1953 (Good)	1600
Jub., 1953 (Good)	1700*
Jub., 1953 (Good)	1850*
Jub., 1953 (Fair)	1450
Jub., 1953 (Good)	1900
8N, 1952 (Excellent)	1850
8N, 1952 (Excellent)	1800
8N, 1952 (Excellent)	1725
8N, 1952 (Excellent)	1675
8N, 1952 (Excellent)	1700
8N, 1951 (Good)	1300*
8N, 1951 (Excellent)	1600
8N, 1948 (Good)	1200
8N, 1948 (Fair)	975
8N, 1948 (Good)	1100*
8N, 1948 (Good)	1300*
8N, 1948 (Excellent)	1650*
8N, 1948 (Excellent)	1600*
8N, 1948 (Fair)	1050
8N, 1948 (Excellent)	1875*
8N, 1948 (Rough)	775*
8N, 1948 (Good)	1600*

INTERNATIONAL HARVESTER TRACTORS

1486 diesel, 1977 (Fair)	5200
1486 diesel, duals, 1976 (Good)	7000*
986 diesel, duals, 1977 (Good)	7000*
784 diesel, 1978 (Good)	5350
656 diesel, 1968 (Rough)	1600*
504, 1960 (Good)	1500
B414 diesel, 1963 (Rough)	500
B414 diesel, 1963 (Good)	1500
340, 1959 (Rough)	400
Cub Loboy, mo., 1963 (Excellent)	2000
Cub, 1948 (Good)	1000

JOHN DEERE TRACTORS

5020 diesel, 1967 (Rough)	2500
4630 diesel, 1976 (Good)	8200*
4630 diesel, 1973 (Fair)	6200
4620 diesel, 1972 (Fair)	5250
4430 diesel, cab, 1977 (Good)	9500*
4430 diesel, 1976 (Rough)	5000
4430 diesel, duals, 1976 (Good)	9000
4430 diesel, 1973 (Good)	9250*
4320 diesel, 1972 (Fair)	5950*
4230 diesel, 1975 (Rough)	3200
2840 diesel, 1978 (Good)	6400*
2640 diesel, 1977 (Good)	6400
2640 diesel, 1976 (Good)	5400
2130 diesel, (Good)	4000*
2040 diesel, 1979 (Excellent)	7300
2040 diesel, 1977 (Good)	5000
2020 diesel, 1966 (Fair)	3400*
2020 diesel, 1965 (Fair)	3000
420, 1957 (Good)	1375
M, plow, har., 1952 (Good)	650

LONG TRACTOR

384 diesel, 1970 (Rough)	775

KUBOTA TRACTOR

L185 diesel, 1978 (Rough)	900

OLIVER TRACTOR

500 diesel, 1961 (Rough)	275

NOTES:
Prices reported are for individual sales at wholesale on an "as is," "cash and carry" basis. Prices reported are not averages.

Condition Classifications:

EXCELLENT: Engine in perfect condition, 400 to 600 hours of use. Rubber—80% tread remaining, no breaks or cracks. Paint—original and bright. General appearance: excellent.

GOOD: Engine in good running condition. Rubber—70% tread remaining, no breaks or cracks. Paint—original or a good repaint job. General appearance: good over-all.

FAIR: Engine possibly in need of a minor overhaul. Rubber—60% tread remaining, some cracking evident in sidewalls. Paint—only fair, weathered and some rust apparent. General appearance: worn, some dents, minor parts (gage covers, etc.) missing or broken.

ROUGH: Engine obviously in need of a major overhaul. Rubber—smooth. Paint—scarred, weathered, rusty. General appearance: dents, ruptures, broken parts, loose wires, components (such as lights) broken, missing or inoperative.

ACE

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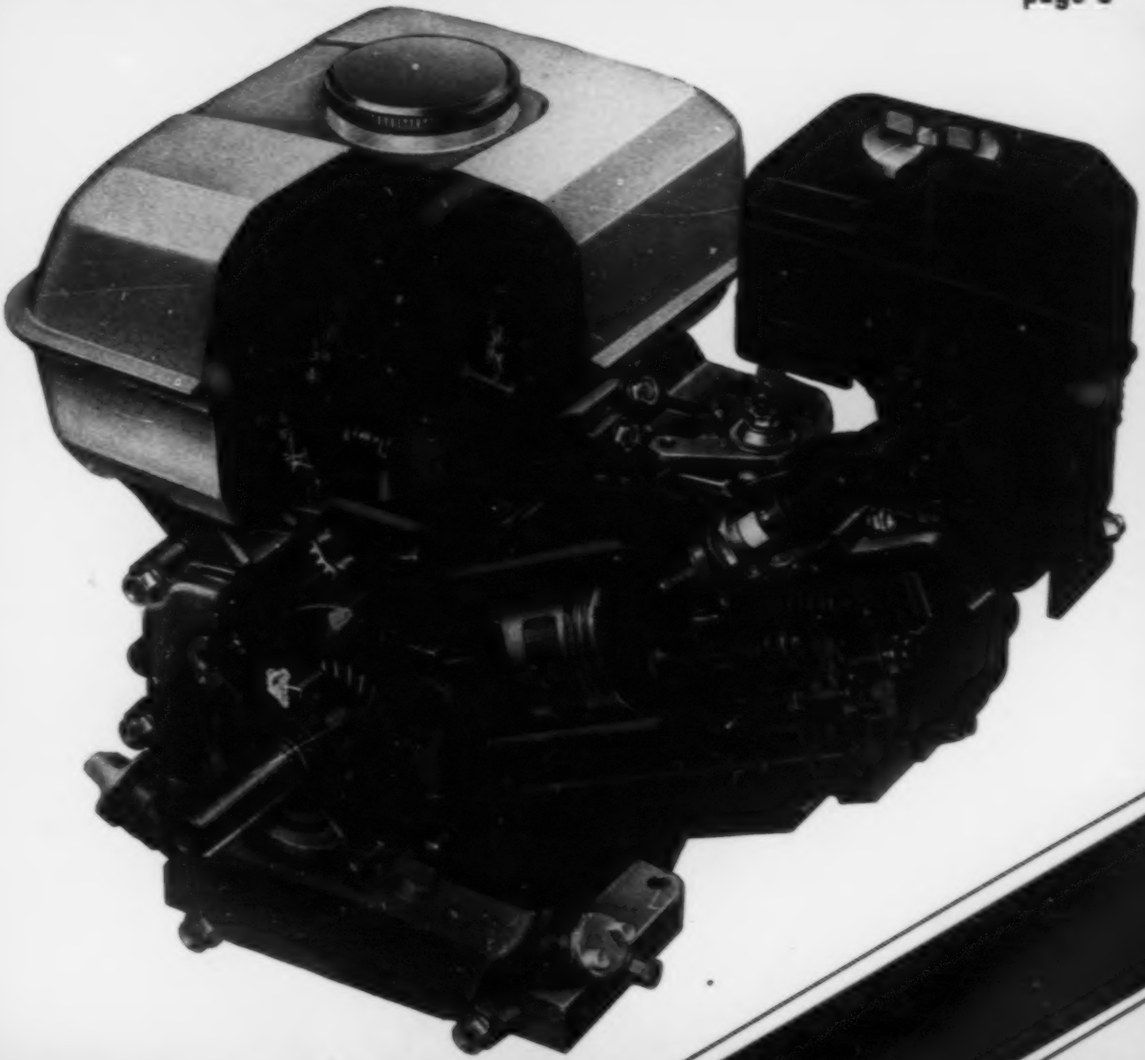
The business magazine of the farm and industrial equipment industry FEBRUARY 1985

Reader Views of the Big Merger page 26

Big Changes in Small Engines

page 8



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Implement
&Tractor

The business magazine of the farm and industrial equipment industry.

February 1985 • Vol. 100 • No. 3

8: **Big Changes in Small Engines.** Engineering advances like Honda's overhead valve system for lawn mower engines have added some excitement and new competitors to the small engine market.

14: **Forecasters' View of 1985: Not Much Change.** A flat year ahead is the concensus of executives from FIEI member companies.

18: **Silver Linings in Smithfield Clouds.** British manufacturers could manage some smiles at the recent Smithfield farm equipment show in London.

22: **How Nebraska Tests Change.** Part 3 of a series on the tractor tests looks at what has changed and what's being discussed.

26: **Survey Finds IH/Case Merger is Welcomed.** Responses to a special I&T survey finds readers think the big merger will help the business.

32: **You Don't Have to be Big to Have a Winter Service Program.** The fourth installment of our Management Modes series shows how off-season service works for a modestly sized dealership.

34: **Dealers See Better Year in 1985.** The I&T FDO Survey report finds dealers optimistic about sales and profits in the coming months.

On the cover...Cutaway view of a new small Honda overhead valve engine.

DEPARTMENTS

I&T Update....................4
Editor's Notebook.............6
Auction Prices................24
What's New....................28
New Literature................42
Industry in Motion............44
Brown Pages...................45
Classified Ads................50
Index to
Advertisers...................50

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I&T Update

U.S. Retail Sales, '84: 117,685 Tractors, 11,441 S-P Combines

Retail sales of farm equipment in the U.S. wound up 1984 with a slight gain in unit sales of tractors, based on strong showings in the lower horsepower categories, and declines in other product groups. The complete flash report provided by the Farm & Industrial Equipment Institute:

	Unit Retail Sales					
	December			January-December		
	1984	1983	Pct. Change	1984	1983	Pct. Change
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	3,245	2,018	+60.8	50,934	45,596	+11.7
40-99 hp	2,770	2,541	+ 9.0	38,270	38,082	+ .5
100-139 hp	737	838	−12.1	9,846	14,503	−32.1
Over 140 hp	902	936	− 3.6	14,659	13,651	+ 7.4
Total 2-wheel drive	**7,654**	**6,333**	**+20.9**	**113,709**	**111,832**	**+ 1.7**
4-wheel drive						
Under 200 hp	177	233	−24.0	1,532	2,075	−26.2
Over 200 hp	225	243	− 7.4	2,444	3,026	−19.2
Total 4-wheel drive	**402**	**476**	**−15.5**	**3,976**	**5,101**	**−22.1**
Total All Tractors	**8,056**	**6,809**	**+18.3**	**117,685**	**116,933**	**+ .6**
S-P Combines	889	1,207	−26.3	11,441	12,755	−10.3
Balers (under 200-lb. bales)	203	170	+19.4	8,313	9,036	− 8.0
Forage Harvesters (shear-bar type)	157	142	+10.6	3,539	4,091	−13.5
Mower-Conditioners	343	427	−19.7	13,057	14,261	− 8.4

Canadian '84 Sales Picture Like the U.S.

Retail sales of farm equipment in Canada, according to the Canadian Farm & Industrial Equipment Institute, were down from 1983 levels in all product categories except tractors.

Product	Unit Sales	Pct. Change
Farm Tractors:		
Under 40 hp	3,450	+22
40-99 hp	8,536	+23
100 hp and over	5,112	− 9
4-wheel-drive	2,512	− 1
Total tractors	19,610	+ 9
Combines (S-P)	2,721	− 7
Combines (P-T)	904	−35
Balers (−200 lbs.)	1,880	− 4
Balers (+200 lbs.)	1,987	−18
Mower-Conditioners	2,195	−11
Swathers (S-P)	1,987	−23
Swathers (P-T)	2,218	− 8
Forage Harvesters	598	−11

Steiger Tractor's '84 Sales: $122 Million

Steiger Tractor Inc. reported sales for fiscal 1984, ended Sept. 30, were $121.8 million and earnings were $1.9 million, compared with 1983's sales of $108.8 million and a loss of $3.6 million.

The fourth quarter of 1984, Steiger's net income was $16,000 on sales of $25.7 million, compared with a year-earlier net of $379,999 on sales of $29.2 million.

David Koentopf, Steiger president and chief executive officer, said that if the same poor agricultural conditions persist in 1985, it would be too optimistic to expect the company to be profitable in 1985.

U.S. Shortliners Form Marketing Deals With European Firms

Taylor/Pittsburgh Implement, Athens, Tenn., manufacturer of tillage equipment, and JF Fabriken of Sonderborg, Denmark, have reached an agreement whereby Taylor/Pittsburgh will market JF's line of harvesting equipment in the U.S. under the brand name JF-Pittsburgh.

The line includes a tractor-mounted grain combine, hay mowers, rakes, conditioners and tedders and forage harvesters.

Agrotec Inc., Pendleton, N.C., manufacturer of spraying equipment, has formed a joint venture with Berthoud S.A., French sprayer manufacturer, to sell Berthoud's air-blast sprayers in the eastern U.S. through Agrotec dealers.

USDA Expects Farmers Will Spend $7.3-7.5 Billion on Machinery

The U.S. Dept. of Agriculture's Economic Research Service is projecting that U.S. farmers' purchases of farm machinery in 1984 were about $7.4 billion and will range from $7.3 billion to $7.8 billion in 1985.

Since 1979, notes ERS, power takeoff capacity for over-40-hp tractor purchases have declined from 15.3 million hp to 6.6 million hp in 1984.

Deere Announces Executive Retirements

Among recent retirements announced by Deere & Co., effective Nov. 30, are the following:

Dr. Gordon H. Millar, vice-president, engineering, since 1972, with the company since 1963. He is currently president of the Society of Automotive Engineers.

Donald O. Carl, director of sales branches, with Deere since 1955.

Willard L. Stowell, director of sales branches, with the company since 1950.

Calvin C. Peterson, director of manufacturing, with Deere since 1952.

Forrest R. Frazier, director of overseas industrial sales, after 33 years with the company.

Researchers Ponder Combines Equipped With Rotary Mowers

Combines equipped with disk-type mowers could save substantial amounts of soybeans that are lost by conventional harvesting methods, according to USDA research.

USDA agricultural engineer John W. Hummel, Urbana, Ill., and other researchers at the U. of Illinois conducted laboratory tests involving high-speed movies and automated data analyses, which simulated harvest losses of less than 2 per cent. Current average loss is about 3.8 per cent.

Wing disks, mounted on the mower frame of a mock-up combine cutterbar, operated at 3,000 rpm with a simulated ground speed of 5.1 mph. Harvest losses were greater at a slower speed—3.4 mph.

Briefly...

The European Economic Community executive committee has fined Deere & Co. $1.4 million for what it said are violations of anti-trust rules forbidding agreements and practices restricting competition. Deere was charged with pressuring dealers in countries in which its products are cheaper not to sell to residents of other EEC nations in which the goods may be more costly. Deere has said it may appeal to the European Court of Justice, according to the *Wall Street Journal.*

U.S. RETAIL SALES FORECAST, 1985, 1986
(In Units)

	Actual Sales 1983	Predicted Last May For 1984	Actual Sales 1984	Sales Forecast For 1985	1986
Farm Tractors:					
Under 40 hp	45,596	46,750	50,934	50,000	51,000
40-99 hp	38,082	41,000	38,270	39,000	40,000
100 hp and over	28,154	31,000	24,505	24,500	24,100
4-wheel drive	5,101	6,000	3,976	3,800	4,200
Total Farm Tractors	116,933	124,750	117,685	117,300	119,800
S-P Combines	12,751	16,000	11,441	11,650	12,000
Corn Heads	6,830	8,650	6,400E	6,600	7,000
Forage Harvesters[1]	4,091	4,100	3,539	3,100	3,300
Balers, Square[2]	9,037	8,700	8,313	8,200	8,200
Balers, Round[3]	12,200E	12,800	11,000E	11,200*	11,600**
Windrowers	2,593	3,315	2,300E	2,600	2,700
Mower-Conditioners	14,261	14,825	13,057	13,100	14,000
Grinder-Mixers	4,018	4,300	2,400E	2,800	3,000

E—I&T estimates. [1] Shear-bar type [2] Bales under 200 lbs. [3] Bales over 200 lbs.
*Given as +2% **Given as +3.5%
Source: Farm & Industrial Equipment Institute.

Forecasters' view of 1985: Not much change

By Bill Fogarty

■HERE'S THE consensus forecast for U.S. retail sales of farm equipment. It covers tractors, main types of field equipment, and farmstead and related equipment. Member executives of the Farm & Industrial Equipment Institute's Marketing & Management Conference made their individual forecasts in December. Their answers were collated and median figures drawn. Some product types are expressed in terms of percentage change from the previous year; others in terms of units.

And what do they see for 1985? The first table indicates a generally flat year, with some products slightly ahead and others down from preliminary results of 1984. As for 1986, the group sees generally modest improvement.

The second table, covering several types of farmstead and field equipment and dealing in percentages only, is generally more optimistic for both 1985 and 1986.

The good news. The first table not only discloses the forecasts; it

(More...)

provides some history: actual sales in 1983, what the group was forecasting for 1984 when last polled in March and April of 1984, and preliminary numbers in most product categories on 1984 actual sales.

The group was predicting a better year in 1984 than was experienced—in all categories except one. Sales of tractors under 40 horsepower roared to a modern-day high of almost 51,000 units, but the forecast had called for a volume of 46,750.

The industry's track record in recent years for forecasting incorrectly being what it is, at least on a consensus basis, perhaps there is a ray of hope. In the past, upturns in the marketplace have caught the industry's marketers as flatfooted as have the downturns. And if they anticipate no improvement of consequence in 1985, perhaps they'll be wrong again!

Other questions. There were 84 companies participating in this year's forecast, 47 from FIEI's Farm Equipment Div., 37 from the Agri-Equipment Div. In addition to wrestling with product outlooks, they had other questions to answer.

As for general industry outlook, *i.e.,* 1985 retail dollar volume in comparison with the 1984 level, the FED group forecast a 1.7 per cent increase. The AED participants saw no change.

They were asked what impact they expect the 1985 Farm Bill now under consideration will have on the agricultural equipment business in the first 24 months after enactment.

Ten of the respondents thought it would have a positive impact; 32 expect a negative impact and 30 see a neutral effect.

The ones who thought positively cited the idea that the farmer would be able to make long-term plans and buying decisions, and that marketplace stability would be helped.

1985-1986 Forecasts on Other Products: Spreaders, Tillage, Agri-Equipment, Lawn/Garden

(Per cent change from previous year's unit volume)

Product	1985	1986
Manure Spreaders	0	−2.8
Moldboard Plows	−5.0	−5.0
Disk Harrows	0	+2.0
Field Cultivators	+5.0	+5.0
Chisel Plows	+4.0	+5.0
Portable Augers, Elevators	+5.0	+5.0
In-Bin Dryers	+4.0	+5.0
Batch/Continuous Flow Dryers	+9.0	+7.0
Dairy/Beef Equip.	0	+4.0
Grain Bins	+5.0	+8.0
Milking Machines	−5.0	0
Lawn/Garden Equipment	+6.0	

Source: Farm & Industrial Equipment Institute

Negative respondents expressed concern about the likelihood of less government involvement and payment to agriculture, delaying a rebound in equipment buying.

A large majority of participants (45) expect farm consolidations to increase in 1985; only six expect a decline and 30 others expect the rate to stay the same. Regardless of how they sized up the rate of consolidation, the majority of comments indicated that the decline in farm numbers itself would continue producing a negative effect.

The ranges. Since this is a consensus forecast, it may be of interest to examine the range of predictions that lead to the median figures in the tables. Thus, on 1985 predictions, we have these spreads:

Tractors under 40 hp: 48,400 to 52,500.

Tractors 40-99 hp: 36,700 to 42,000.

Tractors 100 hp and over: 20,000 to 29,000.

Four-wheel-drive tractors: 3,600 to 4,900.

Combines: 10,200 to 15,000.

Corn heads: 5,500 to 7,000.

Forage harvesters: 2,600 to 4,200.

Balers (square): 7,500 to 9,000.

Balers (round): −5 to +10 per cent.

Chisel plows: −24 to +5 per cent.

Grinder mixers: 2,500 to 3,400.

Manure spreaders: −2.7 to +13 per cent.

Lawn and garden: zero to +10 per cent.

Augers/elevators: −10 to +30 per cent.

In-bin dryers: −20 to +25 per cent.

Batch, continuous-flow dryers: zero to +15 per cent.

Dairy/beef equipment: −10 to +5 per cent.

Grain bins: −40 to +44 per cent.

Milking machines: −20 to +5 per cent.

And the range of change in retail dollar volume ran from −15 to +12 per cent among Farm Equipment Div. participants; among Agri-Equipment Div. forecasters, it was −15 to +32 per cent.

I&T
SINCE 1886

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

JONES FARM EQUIPMENT CO.
Dothan, Alabama
December 11, 1984

ALLIS-CHALMERS TRACTORS

7030 diesel, 1974 (Fair)	4250
WC, 1944 (Rough)	275
C, 1945 (Fair)	500*
B, 1940 (Rough)	320

CASE TRACTORS

1030 diesel, 1968 (Rough)	1700*
530 diesel, 1964 (Fair)	1750

MASSEY-FERGUSON TRACTORS

1155 diesel, 1975 (Rough)	5500
1130 diesel, 1972 (Rough)	2700*
1130 diesel, 1968 (Rough)	2250*
1105 diesel, bid., 1977 (Good)	4350*
1085 diesel, 1977 (Good)	4125*
1085 diesel, 1975 (Fair)	3550*
1085 diesel, 1975 (Fair)	3350
275 diesel, 1976 (Good)	6400
265 diesel, 1978 (Good)	6000
265 diesel, 1977 (Good)	5950
265 diesel, 1975 (Good)	6000
265 diesel, 1975 (Good)	5400*
255 diesel, 1979 (Good)	5200*
255 diesel, 1976 (Good)	5000
245 diesel, 1977 (Excellent)	6100
245 diesel, 1976 (Excellent)	5750
230 diesel, 1976 (Good)	3600
180 diesel, 1968 (Good)	3500
180 diesel, 1966 (Rough)	1900*
180 diesel, 1966 (Good)	3000
175 diesel, 1970 (Good)	3475
175 diesel, 1970 (Good)	3450*
165 diesel, 1968 (Good)	2850
165 diesel, 1966 (Good)	2950
165 diesel, 1966 (Rough)	2300
150 diesel, 1965 (Good)	3200
135, 1972 (Excellent)	4100*
135 diesel, 1972 (Good)	2750
135 diesel, 1967 (Good)	3200
135 diesel, 1967 (Fair)	2700*
135 diesel, 1967 (Good)	3275
135, 1967 (Rough)	1250
135 diesel, 1966 (Fair)	2600*
65 diesel, ldr., 1964 (Excellent)	3650
65 diesel, 1963 (Good)	1650*
50, 1959 (Good)	2350
35 diesel, 1963 (Excellent)	3150
35 diesel, 1962 (Excellent)	2750
35, 1960 (Excellent)	2750
35, 1959 (Rough)	1150
35, 1957 (Good)	2400*
35, 1956 (Fair)	1475
25 diesel, 1964 (Fair)	1925
TO30, 1953 (Rough)	725
TO30, 1953 (Good)	1475
TO30, 1953 (Fair)	1100
TO20, 1951 (Good)	1400
TO20, 1950 (Rough)	550
TO20, 1950 (Rough)	625
TO20, 1949 (Good)	1350

FORD-FERGUSON TRACTORS

9N, 1946 (Good)	1225
9N, 1944 (Good)	1000*
9N, 1942 (Rough)	375
9N, 1942 (Rough)	410

FORD TRACTORS

8700 diesel, 1977 (Fair)	6900*
8700 diesel, 1977 (Good)	7600
8600 diesel, 1974 (Fair)	3550
7700 diesel, cab, 1979 (Excellent)	13,500*
7700 diesel, 1978 (Excellent)	11,000*
7600 diesel, 1975 (Excellent)	6100*
7000 diesel, 1975 (Good)	5750
6700 diesel, 1975 (Good)	8800*
5000 diesel, 1972 (Excellent)	5150
5000 diesel, 1970 (Good)	3950*
5000 diesel, 1968 (Fair)	3275
4000 diesel, 1970 (Excellent)	4250*
4000 diesel, 1966 (Fair)	2650
4000 diesel, 1966 (Fair)	2700*
4000 diesel, 1963 (Excellent)	2550
4000 diesel, 1963 (Good)	1925
3600 diesel, 1976 (Excellent)	6500
3000 diesel, 1972 (Fair)	3350
3000 diesel, 1972 (Good)	4100
3000 diesel, 1971 (Good)	3700*
3000 diesel, 1971 (Good)	3800
3000 diesel, 1968 (Fair)	3200
3000 diesel, 1968 (Fair)	2800*
3000 diesel, 1966 (Fair)	2600
2600 diesel, 1979 (Excellent)	5100*
2000 diesel, 1971 (Fair)	2400
2000 diesel, ldr., 1967 (Fair)	2750
2000 diesel, 1967 (Fair)	2625
2000 diesel, 1966 (Fair)	2650
2000, 1963 (Good)	2725
961, 1958 (Good)	1975*
861, 1960 (Fair)	1400
841 diesel, 1958 (Fair)	1550
661, 1960 (Good)	1600*
641, 1961 (Excellent)	2300*
640, 1956 (Good)	2000
640, 1956 (Good)	2250
620, 1956 (Good)	1700*
Dexta, 1959 (Fair)	1275
Jub., 1953 (Good)	1850*
Jub., 1953 (Excellent)	2500*
Jub., 1953 (Fair)	1400*
Jub., 1953 (Good)	2075
Jub., 1953 (Good)	1800
8N, 1952 (Good)	1775
8N, 1951 (Good)	1600*
8N, 1951 (Good)	1650
8N, 1951 (Good)	1825
8N, 1950 (Rough)	975*
8N, 1949 (Rough)	850
8N, 1949 (Fair)	1550
8N, 1949 (Fair)	1400*
8N, 1949 (Good)	1600
8N, 1948 (Fair)	900
8N, 1948 (Fair)	850
8N, 1948 (Rough)	700
8N, 1948 (Good)	1550
8N, 1948 (Good)	1600
8N, 1948 (Good)	1325
8N, 1948 (Good)	1400
8N, 1948 (Rough)	675
8N, 1948 (Fair)	1400

INTERNATIONAL HARVESTER TRACTORS

1086 diesel, 1979 (Good)	7900*
1066 diesel, 1973 (Rough)	4700*
966 diesel, 1973 (Fair)	4400
856 diesel, duals, 1970 (Good)	3500
674 diesel, 1976 (Good)	4100
674 diesel, 1976 (Excellent)	5050
656 diesel, 1969 (Fair)	2850
584 diesel, cab, 1978 (Good)	4900
574 diesel, 1973 (Fair)	3500*
464 diesel, 1974 (Fair)	2600*
454 diesel, 1971 (Fair)	2825
434 diesel, (Fair)	1900
Sup. C, cult., 1953 (Good)	675
Sup. C, 1952 (Good)	625
130, cult., plow, plt., 1957 (Good)	1900*
Sup. A, mo., 1953 (Fair)	1250*
185 Cub, Loboy, 1974 (Good)	1700

JOHN DEERE TRACTORS

4640 diesel, 1970 (Excellent)	24,000*
4520 diesel, 1970 (Good)	6350
4440 diesel, cab, 1978 (Excellent)	17,500*
4440 diesel, 1978 (Excellent)	18,000*
4430 diesel, 1977 (Good)	9000
4430 diesel, 1975 (Excellent)	10,100*
4320 diesel, 1971 (Fair)	4300
4030 diesel, 1976 (Excellent)	10,000*
4020 diesel, 1969 (Rough)	3850
4020 diesel, 1967 (Rough)	3500
3130 diesel, (Good)	5100*
3130 diesel, (Excellent)	6800*
3040 diesel, 1978 (Good)	6500*
2840 diesel, 1979 (Excellent)	8550
2640 diesel, 1978 (Excellent)	6700
2440 diesel, 1976 (Excellent)	4350
2130 diesel, cab, (Good)	4200*
2130 diesel, (Fair)	2800*
2030 diesel, 1973 (Good)	3500
2020 diesel, 1968 (Rough)	2350
2020 diesel, 1968 (Good)	3900
1020 diesel, 1968 (Good)	3100*
1020 diesel, 1968 (Excellent)	3800
1010, 1962 (Excellent)	1800
820 diesel, 1973 (Good)	2250
420, 1957 (Good)	825*
MT, cult., 1949 (Good)	700

KUBOTA TRACTORS

L225 diesel, 1976 (Excellent)	2275
L225 diesel, 1976 (Excellent)	2250
L225 diesel, 1976 (Excellent)	2100*

LONG TRACTORS

460 diesel, (Excellent)	4100*
360 diesel, (Good)	3450

OLIVER TRACTORS

1465 diesel, 1974 (Fair)	2200
1365 diesel, 1973 (Fair)	2000

YODER & FREY, INC.
Archbold, Ohio
Dec. 11, 1984

INTERNATIONAL HARVESTER TRACTORS

BN, 1946 (Fair)	475
H, 1947 (Fair)	450*
H, 1939 (Rough)	375*
H, 1950 (Fair)	725
H, 1946 (Fair)	450*
H, 1951 (Fair)	685
H, 1949 (Good)	775
H, 1944 (Rough)	375
H, 1947 (Fair)	450*
SH, 1951 (Fair)	525*
M, 1946 (Rough)	375*
M, 1942 (Fair)	425*
M, 1940 (Rough)	500
M, 1950 (Fair)	975
M, 1948 (Fair)	725*
Sup. M, 1952 (Fair)	900
Sup. M, 1951 (Rough)	950*
Sup. M, 1952 (Fair)	640
Sup. M, 1950 (Fair)	760*
Sup. M, 1950 (Fair)	860
140, 1960 (Fair)	2450
200, 1957 (Fair)	800*
200, 1958 (Fair)	850
300, 1957 (Fair)	1025
340, 1959 (Rough)	1300
350, 1957 (Fair)	925
434 diesel, (Rough)	1200*
460, 1959 (Fair)	1075*
460, 1960 (Fair)	1450
560, 1962 (Good)	2650*
560 diesel, 1960 (Fair)	2275
560, 1958 (Fair)	1300*
565 diesel, 1969 (Fair)	4200*
565 diesel, 1968 (Fair)	3900
565, 1968 (Rough)	3100*
C,	250
684 diesel, 1977 (Fair)	4200*
686 diesel, 1978 (Fair)	5500*
706, 1965 (Fair)	2750*
706, 1964 (Fair)	1900*
706, 1964 (Rough)	1900*
756, 1970 (Good)	5500
756, 1969 (Fair)	3100
756, 1968 (Fair)	5600*
766 diesel, 1973 (Fair)	3700*
806, 1965 (Fair)	4050
806, 1964 (Rough)	1750
806, 1964	2600*
806, 1966 (Fair)	3400*
856 diesel, 1969 (Good)	6300*
856, 1967 (Good)	6500*
966 diesel, 1972 (Good)	7200*
966, 1972 (Good)	6800*
966, 1974 (Fair)	7750*
966, 1974 (Fair)	7000*
986, 1976 (Good)	10,200
986, 1977 (Good)	11,500*
1066, 1973 (Fair)	6450
1066, 1976 (Fair)	7000*
1066, 1974 (Fair)	6100
1066, 1971 (Good)	7800*
1066 diesel, 1973 (Fair)	6700*
1066 diesel, 1972 (Fair)	6600*
1066, 1973 (Rough)	4100*
1086, 1977 (Good)	10,000*
1086, 1977 (Good)	10,000
1086, 1978 (Rough)	11,250*
1086, 1979 (Good)	12,200
1206, 1964 (Fair)	3600*
1206, 1964 (Fair)	3800*
1256, 1969 (Fair)	5300*
1256 diesel, 1970 (Fair)	5250*
1256, 1970 (Fair)	5400*
1456, 1968 (Fair)	4800*
1466, 1975 (Fair)	6800*
1466, 1975 (Fair)	6100
1466, 1974 (Fair)	5750*
1466, 1973 (Good)	7200*
1468, 1977	12,500*
1586, 1977 (Good)	11,250*
3788, 1979 (Good)	20,000*
4166, (Rough)	6000*

FORD TRACTORS

8N,	1400
8N,	1300
8N, 1947 (Fair)	800*
8N, 1947 (Fair)	975*
8N, 1950 (Fair)	1200*
9N, 1944 (Rough)	800*
9N, 1941 (Rough)	850*
NAA, 1954 (Fair)	1750
700,	1250

(Continued on page 36)

Scott Nesbitt:

Survey Finds IH/Case Merger Is Welcomed

How Readers View the IH/Case Merger

Type of Dealer	Will Help	Will Hurt	No Impact
International Harvester	82	8	0
J I Case	16	5	1
Deere	35	17	11
Allis-Chalmers	4	9	0
Ford	6	7	7
Massey-Ferguson	2	3	3
Kubota	1	1	2
White	1	1	2
Other Brands	5	6	4
Non-Dealers			
Indepedent Repair Shops	4	4	8
Manufacturers	12	6	4
Sales Reps, Marketing	10	8	2
Farmers	8	8	3
Total 316:	**186**	**83**	**47**

Responses to question "How will the Case/Harvester deal affect your business? Survey form published in December, 1984 *Implement & Tractor.*

IH and Case dealers are almost bursting with joy, while others think the proposed merger of those two lines will at least do more good than harm for business.

That's one of the conclusions that can be drawn from the 316 responses I&T got to a survey that ran in the December I&T, shortly after Tenneco, Inc., announced plans to purchase International Harvester's ag division and merge it with J I Case operations. (The deal was pending government approval at I&T presstime.)

When responses were broken down into categories and the dealers were sorted into the brands of equipment carried, 82 IH dealers said the deal would help their business, against only eight who said it would hurt.

On the Case side, 16 said it will help, five said it would hurt, and one said it would have no impact. That one explained he had no local IH competitor, and added that the deal will strengthen Case as a farm equipment manufacturer.

As the table shows, Deere dealers also thought the deal would help more than hurt, especially when the "help" and "no impact" responses are added together.

Of all types of dealerships, only Allis-Chalmers dealers recorded a strongly negative response. The others had rather mixed reactions, but generally those who said it would hurt their business were outweighed by the "help" and "no impact" responses taken together.

The rest of the conclusions from the table can be drawn by the reader, with a cautionary note: Many multi-line dealers responded and they were classified by the first brand name listed. To list responses by specific combinations of lines would be unwieldy and add little information.

Note also that the survey is not to be considered scientifically accurate, due to the sampling method and inability to screen out multiple responses from extra-eager individuals.

Words of wisdom

The survey numbers may not be scientific, but the comments jotted on the survey form proved to be lengthy and generally very thoughtful.

"The merger should produce a stronger number two manufacturer, but I don't look for any major jump for at least five years, until the loyal IH customers get over the shock of the sell," wrote one IH dealer, picking up the general tone of comments that the merger would help in the long run.

Many dealers, from all brands, made comments like this one: "In the short term, customers are all expecting big rebates from IH."

Worry about a "closeout" sale on IH products was widespread, with Deere frequently seen as the beneficiary if the market was heavily disrupted by massive price cutting.

"We should be able to gain market share in areas where IH has been our main competitor," wrote one Deere dealer. Another commented the merger "will make Tenneco look at the profit-or-loss line with more respect. I believe they will be less competitive because

(Continued on page 44)

FDO
CASE
INTERNATIONAL

FDO Survey Report

Dealers See Better Year in 1985

■IS IT THAT hope springs eternal? Could it be that dealers are natural optimists? Or do they just understand their markets better than anyone else?

Whatever the reason, a large majority of the dealers who ventured predictions for 1985 in an I&T survey see a moderately better year coming for their businesses.

Of 66 dealers who answered the survey, which appeared in the November I&T, 40 predicted an upturn in gross revenues for 1985, while 11 saw a downward trend, and 15 expected things to stay about the same.

"This is just wishful thinking," wrote one dealer who joined the "uppers." And even one of those who saw his gross revenues slipping by 5 per cent predicted his profits would go up by 20 per cent, explaining that "parts sales and resulting service sales are very profitable and building."

All three groups—uppers, downers and samers—predicted that parts and service sales would go up, by 9.8 per cent and 7.7 per cent respectively. The combined groups also predicted that wholegoods sales would go up 5 per cent, and used wholegoods sales would rise 4 per cent. The uppers were even more optimistic.

The stars of the wholegoods categories were tractors under 40 hp, predicted to go up 10.1 per cent, and combines, up 8.5 per cent.

Deriving the predictions

Not every dealer put down a number in the space provided for predictions on the survey form. Those who didn't were not counted in deriving the predictions shown in the table, though it should be noted that the trend of those who simply checked an up or down space followed that of the general trends expressed by each group.

To get the predictions shown, we added all the up and down predictions with those who predicted "same"—which translates to a zero per cent prediction—and took a simple average.

Scientific? Probably not. Optimistic? Definitely.

It's interesting to note that only 37 of the 66 responding dealers said they were overstocked, and those who said they were averaged out to a 14 month supply, with the highest estimate reaching 24 months reported by eight dealers. I&T

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IMT 539 Deluxe

Reproduction of Massey-Ferguson 35

Parts Interchangeable

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Write In (20) on Reply Card

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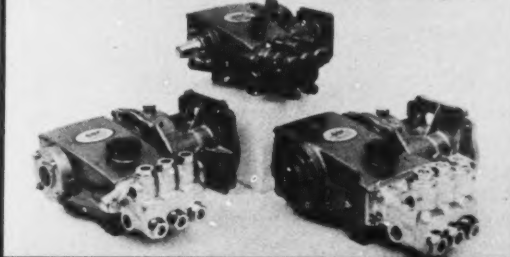

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Custom Selection Available. You can select from more than 150 models available from stock to satisfy your immediate needs, or we can custom build a pump to meet your exact specifications. We also have the largest technical staff and international network of sales and service representatives available to serve you wherever you are.

Cat Pumps Perform. Cat Pumps have more industrial high pressure Triplex Pumps in operation worldwide than any other manufacturer. Today we are performing over 500 different applications.

Rely On Cat Pumps. Cat Pumps maintains the highest standards in materials and engineering to provide longer life and dependability in all of our pumps. Materials like nickel aluminum bronze, 316 stainless steel, Nitronic 50, Viton and Teflon assure you of superior performance.

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FREE BROCHURE.**

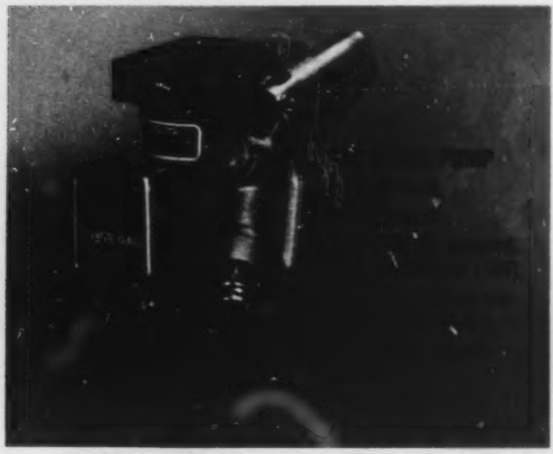
Cat Pumps Corporation, 1681 94th Lane N.E., Mpls., MN 55434
Phone: (612) 780-5440 Telex 29076

Write In (21) on Reply Card

Most Dealers See 1985 Sales Upturn

Group Number in group	Uppers (40)	Downers (11)	Samers (15)	Total (66)
What will your GROSS REVENUES do in 1985?	12.5	−10.8	0	5.9
What will happen to your PROFITS next year?	9.3	− 7.5	−4	3.6
What changes do you expect in your DEPARTMENTS next year?				
Wholegoods sales	11	−12.5	3.3	5
Used Wholegoods	8.3	− 7.2	0	4
Parts Sales	12.4	6.2	5.8	9.8
Service Sales	10.7	2	3.7	7.7
What will SALES of these equipment categories do in your business next year?				
Tractors (40 hp and more)	12.2	−8.7	1.8	6.3
Tractors (under 40 hp)	12.8	0.2	10	10.1
Combines	16.4	−6.8	0.3	8.5
Tillage tools	8.4	−6.4	5	5.3
Planters	7.5	−5.4	5.4	5.1
Fertilizers	−1.5	−1.1	0.1	−1.1
Cultivators	3.2	−4.3	3.1	2
If you are OVERSTOCKED with new equipment, how long will it take to get down to reasonable levels?	14 mos.	16 mos.	12 mos.	14 mos.
Number of dealers responding	(16)	(10)	(11)	(37)

All respondents gave title as owner, president, vice-president or manager. Table includes responses received by Dec. 10, 1984.



727 SERIES METER
Handles flow rates from 3 to 15 GPM*.
Self-lubricating gravity and filter models.
Register with ⅜" numerals.
Manual reset with zero stop.
100 gallon counter; 100,000 gallon totalizer.
1" inlet and outlet
(¾" hex. bushings included).
Viscous model available.

Smooth-Flo™ dependability on the farm

You've used our pumps at service stations throughout the country. Now, for the farm we recommend the proven 720 Series pump and 727 Series flow meter.

Acre-to-acre and mile-after-mile, the 720 Series pump goes wherever it's needed. It's powered by a common 12V vehicle battery—the ideal convenience for truck-mounted tanks. The 727 meter, for use with transfer and hand pumps or gravity tanks, measures liquid transfers to within ±3% accuracy. It features an extra-durable, die-cast aluminum housing and non-corrosive internals.

Both series are Tokheim-built for rugged dependability and years of reliable accuracy.

TOKHEIM
Systems for the Movement and Measurement of Liquids
TOKHEIM CORPORATION
COMMERCIAL PRODUCTS DIVISION
DEPT. IT 2-4
FORT WAYNE, IN 46801
(219) 423-2552

TOTAL QUALITY ASSURANCE

UL listed
Not for resale of fuel
*Flow rates stated are subject to conditions of installations and accessories used.

Write In (22) on Reply Card

Auctions

(Continued from page 24)

900, 1958 (Rough)	875
601, 1956 (Fair)	2000
2000,	1750
2000, 1964 (Fair)	1500*
4000, 1970 (Good)	3600*
4000, 1963 (Fair)	1275*
5000 diesel, 1966 (Fair)	2400
5000, 1972 (Good)	4900*
8000 diesel, 1974 (Fair)	3800*
8000, 1971 (Fair)	3600
8000, 1971 (Fair)	3400*
9600, 1975 (Fair)	4600
6700, 1972 (Good)	9000*
7600, 1980 (Rough)	5600
2910,	8500
3000, 1964 (Fair)	2750
3000, 1966 (Rough)	2600*
3910, (New)	8900*

WHITE TRACTORS

2-70, 1976 (Good)	7750*
2-105, (Fair)	7[illegible]00
4-150, (Rough)	7000

JOHN DEERE TRACTORS

A,	100
70 diesel, 1956 (Rough)	1175
70 diesel, 1955	875*
70, 1953 (Fair)	600*
620, 1958 (Fair)	1400
520, 1957 (Good)	1950*
510,	2200
730, 1959 (Fair)	1725*
2020, (Rough)	3075
2440 diesel, 1979 (Good)	5650
3010 diesel, 1963 (Fair)	3050
3010, 1962 (Fair)	2425
3010 diesel, 1961 (Fair)	3000
3010 diesel, 1963 (Good)	4000
3020 diesel, 1966 (Fair)	4000*
3020 diesel, 1968 (Fair)	3900*
4010 diesel, 1962 (Fair)	3300*
4010, 1962 (Fair)	3100
4010, 1963 (Fair)	3075
4010, 1960 (Fair)	4300
4020, 1966 (Fair)	2800
4020 diesel, 1967 (Good)	6300*
4020, 1968 (Fair)	3400*
4020, 1966 (Fair)	4900
4020, 1971 (Good)	7500*
4020 diesel, 1968 (Fair)	6100*
4020 diesel, 1971 (Good)	7300*
4040,	11,400
4230,	11,000
4240, 1983 (Excellent)	23,000*
4320, 1972 (Fair)	7450
4440, 1979 (Fair)	18,500*
4440,	14,500
4630, 1975 (Fair)	11,500*
6030 diesel, 1972	9250*

CASE TRACTORS

400 diesel, 1958 (Fair)	1300*
730, 1965 (Fair)	900*
830 diesel, 1966 (Good)	2200*
830, 1969 (Rough)	2100*
830,	800
930 diesel, 1967 (Fair)	2300*
1070, 1971 (Fair)	7100*
1270, 1976 (Rough)	4400*
1370, 1975 (Fair)	8100*
1370 diesel, 1974 (Fair)	6800*
1470 TK, (Fair)	4500*
2290, (Fair)	8700
2290, 1977 (Good)	13,000*
2670, 1975 (Fair)	10,700*
2670, 1974 (Fair)	10,050
1194 diesel, (New)	7300*
VAC,	200

DEUTZ TRACTORS

DX110, 1981 (Good)	10,300
DX110, 1980 (Good)	11,500*
D5006, (Rough)	3750*

MINNEAPOLIS-MOLINE TRACTORS

445, (Rough)	450*
445, 1955 (Fair)	1000
M-670, 1964 (Fair)	900*
M-670, 1962 (Fair)	2350
G-1000, 1967 (Fair)	2000
Z, 1952	400

ALLIS-CHALMERS TRACTORS

WD,	1000
WD-45, 1955	1150
D-15,	2900
D-17, 1963 (Fair)	1400
D-17, 1960 (Fair)	1750
D-17, 1963 (Fair)	2050*
170, 1964 (Fair)	3350
185, 1975 (Rough)	4000
185 diesel, 1976 (Fair)	4500*
190,	2750
190XT, 1966 (Rough)	3500
190XT diesel, 1970 (Good)	3000*
200, 1971 (Good)	5750*
200, 1971 (Fair)	6100
210,	2650
5040 diesel, 1975 (Fair)	3100*
7000 diesel, 1976 (Good)	7400*
7030 diesel, 1977 (Fair)	6100*
7050, 1976 (Fair)	5400*
7580, 1976 (Fair)	13,500*

FERGUSON & MASSEY FERGUSON

TO-30, 1950 (Rough)	1100
F-40,	1650
50 diesel, 1962 (Fair)	2100*
50,	1450
65 diesel, 1962 (Rough)	1425
65 diesel, 1961 (Rough)	1250
135, 1968 (Fair)	2250
180, 1967 (Fair)	2900*
1085 diesel, 1976 (Rough)	4700*
1085, 1976 (Fair)	4500*
1105 diesel, 1977 (Fair)	4700*
1135 diesel, 1975 (Fair)	5750*
1500, 1974 (Fair)	4900
178,	3175

DAVID BROWN TRACTORS

950 diesel, 1964 (Rough)	500*

OLIVER TRACTORS

1555 diesel, 1966 (Good)	3000
1600,	1950
1650,	2775
1650, 1965 (Fair)	2400*
1750, 1964 (Fair)	2900
1755, 1973 (Fair)	4300*
1800 diesel, 1961 (Fair)	2000*
1800 diesel, 1961 (Fair)	1925
1850, 1966 (Fair)	2800*
1850, 1967 (Fair)	3800
1855, 1972 (Good)	5100
1855 diesel. 1973 (Good)	4900*
1950, 1965 (Fair)	4000

LONG TRACTORS

56 diesel, (Fair)	3500

KUBOTA TRACTORS

L285 diesel	3150
B6100-D	3800*

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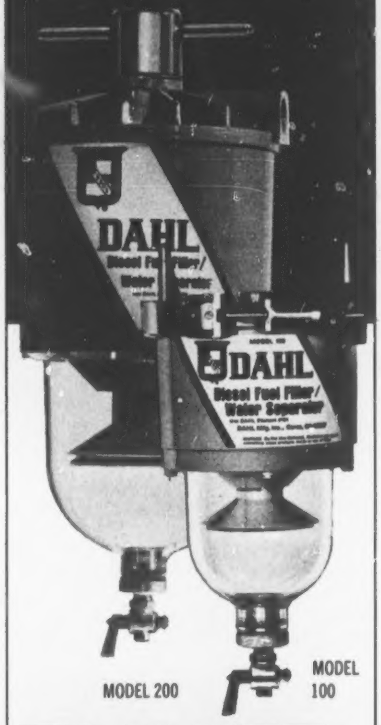

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Welcome Merger

(Continued from page 26)

it's a larger part of their total business" (than when they owned Case alone).

A presumably survey-conscious Deere dealer wrote, "We feel IH customers with loyalty to it will more likely than not purchase JD rather than Case the next time. In every case, the IHC customer we talked to said JD was their original second choice."

A-C dealer comments

The fact that Allis-Chalmers dealers took a more negative view of the deal than others was hard to explain other than that none of the 13 dealers in that category said it would have no impact on their particular business. Among other brands, the "hurts" led or matched the "helps," but the presence of those who checked "no impact" balanced things out.

Typical of many comments from A-C and other dealers was this one: "We have been helped some in the last two years because a few IH users were coming our way. This will stop if the dealer organization doesn't crumble."

Another dealer listed reasons he felt he'd be hurt: "1. Inventory will be sold at cheap prices. 2. Combined they (Case and IH) will be hard to beat for a small company. 3. Make market unstable for years to come."

Industry in Motion

Fleischer Mfg., Inc., Columbus, Neb., has donated a Buffalo All-Flex till planter and a Buffalo cultivator to the Central Community College at Hastings, Neb.

Eddie D. Estes, president of **Western Kansas Manufacturers Assn. 3i Show,** has been elected president of the **North American Farm Show Council.** The Council membership consists of 17 farm shows that are held in the U.S. and Canada each year.

Jon P. Adamson has been named vice-president and general manager-Diesel Systems at **United Technologies Automotive,** Dearborn, Mich. Also, the Diesel Systems division is now consolidated with the Components division based in Columbia City, Ind.

Durwood Phillips has been appointed the new president of **Powell Mfg. Co., Inc.,** Bennettsville, S.C., succeeding Robert W. Wilson who has retired.

The Gregory Mfg. Co., Lewiston-Woodville, N.C., has bought the business and assets of **Harrington Mfg. Co.,** Lewiston-Woodville, N.C. Charles E. Gregory is president and CEO of The Gregory Mfg. Co.

C. F. Buck Farmer, chairman of **Implement Sales Co., Inc.,** Memphis, Tenn., has announced his retirement effective January 1, 1985. Also, **Gebruder Welger Co.,** West Germany, has appointed Implement Sales Co. as distributor of its line of roll and square balers for the Southern U.S.

Use I&T's Handy Reply Card

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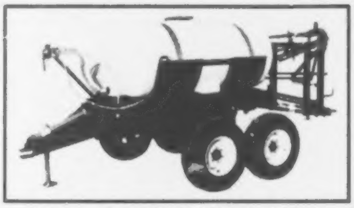

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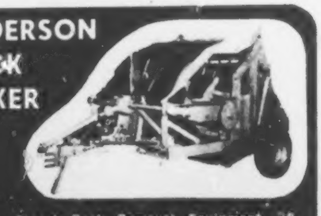

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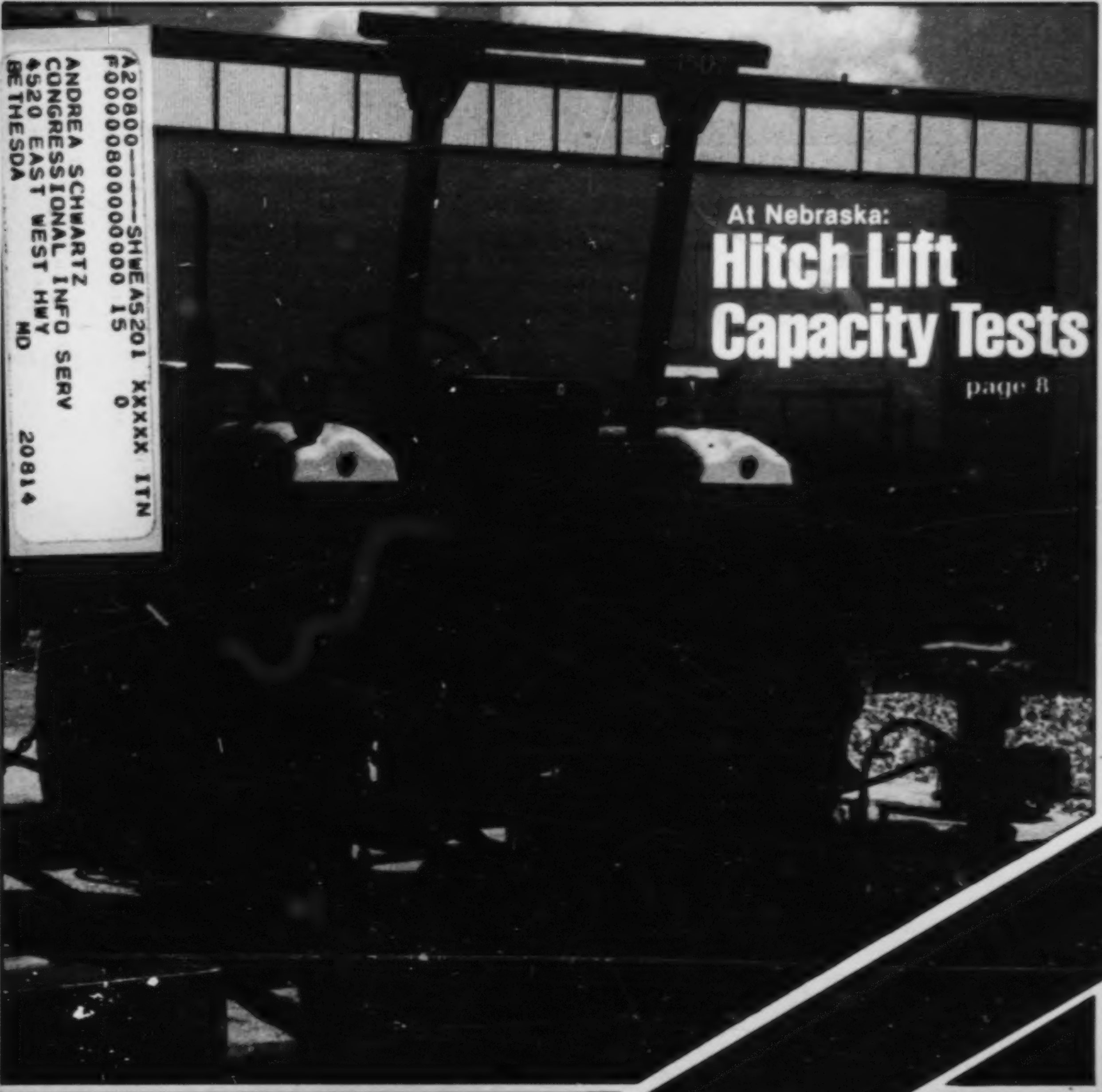
The business magazine of the farm and industrial equipment industry MARCH 1985

Tractors on the North American Market page 26



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At Nebraska:

Hitch Lift Capacity Tests

page 8

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INTERTEC
PUBLISHING CORPORATION

Implement &Tractor

The business magazine of the farm and industrial equipment industry.
March 1985 • Vol. 100 • No. 4

8: **They're Testing Tractor Hitch Lift Capacity at Nebraska.** There's been much debate and compromise in setting the procedure—and it's still controversial. Part Four of a series.

12: **It Starts With Planning.** Part One of a three-part series by a marketing specialist is aimed at helping dealers who are seeking new means of staying in busines to get a focus on what has to be done.

14: **Novel Ways to Cut Costs.** I&T's FDO survey report on cutting costs lists something as simple as an egg timer to help cut high phone bills, to high-ticket items like computers to save money in the long run. Listen up, suppliers, there are some messages for you too.

26: **Tractors on the Market, 1985.** Two charts show model numbers and power comparisons for 2- and 4-wheel drive tractors sold in North America this year.

34: **New Equipment Introductions.** White Farm Equipment launches a new Class 5 axial combine and a 28-hp tractor. Kubota expands its L Series of tractors.

On the cover...
A new Ford tractor undergoes testing of hitch lift capacity on a special rig at the Nebraska Tractor Test Lab.

DEPARTMENTS

I&T Update....................4
Editor's Notebook.............6
Auction Prices................18
What's New..................22
Brown Pages 38
Classified Ads................42
Index to
Advertisers 42

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Marriage of Case and IH Consummated; Children to be Raised Red

The family color will be red, the attitude will be aggressive, and the new product line will be named Case International.

That was the word in Las Vegas, world capital of quickie marriages and serious gambling, where Tenneco, Inc., held in late February the first official dealer meeting of the combined J I Case and International Harvester dealer families.

Three months after announcing the $430-million-plus merger, and barely three weeks after the U.S. Justice Dept. decided to forever hold its peace, the Tenneco ag team on Feb. 23 tossed a big party for dealers and the press, and rolled out the wedding gifts.

Mechanically, the combined product lines remain the same, except that the IH 2+2 tractors are gone. All products will carry red paint, slightly darker than traditional IH red.

The company name will remain J I Case, but dealer signs and medallions on equipment will use a logo combining the CASE and IH symbols. Viewed from the left side, products will be named CASE International, which becomes International CASE when seen from the right side.

Discounts and programs

Retail financing at 8.8 per cent will be offered for this selling season, and machines built after March 18, when production is to resume, will be priced 7 to 20 per cent below pre-merger levels, with especially deep cuts in 4WD tractor prices. Machines built before the merger will get rebates and incentives to clear stock. Some used equipment will be eligible for 10 per cent financing.

Tenneco president James L. Ketelsen told the assembled dealers at the first of three Las Vegas meetings that Case can be profitable this year if the new operation can maintain the market share held by the two operations separately last year.

Part of the profit strategy will include urging the 2,000 CaseIH dealers to sell the red equipment line rather than competing shortlines, which Case dealers had to stock during the "tractor specialist" era at Case.

Case will use "the power of logic and common sense" and an IH-type volume discount program to scramble for the top of the market, said John A. Borden, executive vice-president for marketing.

"You don't see a lot of competitive equipment in Deere dealers' lots," Borden said. "We've got to get our act together and operate the same way."

Overseas connections

Ketelsen told a press conference he hopes to reach agreements by April to purchase former IH facilities in Germany and France. French law, he said, prohibits layoffs at the French plant, which has been losing $30 million a year and has a net worth deficit of $95 million. He wants the government to yield.

"It's going to be a trading deal," Ketelsen said. "We will not (restart the plant) without accommodation. We can run without them. But it's a plus if we can do it right."

January Retail Sales Continue Most '84 Trends

Retail sales of farm equipment in the U.S., as reported by the Farm & Industrial Equipment Institute, appeared to follow earlier paths. Tractor volume was about even in terms of total numbers, but this was largely due to strength in the under-40-hp and 100-139-hp groups. Among other tractor and equipment categories, only mower-conditioners posted a gain.

	Unit Retail Sales		
	January 1985	**January 1984**	**Pct. Change**
Farm Wheel Tractors:			
2-wheel drive			
Under 40 hp	2,423	2,140	+13.2
40-99 hp	2,742	3,082	−11.0
100-139 hp	873	736	+18.6
Over 140 hp	1,134	1,222	− 7.2
Total 2-wheel drive	**7,172**	**7,180**	− **.1**
4-wheel drive			
Under 200 hp	96	141	−31.9
Over 200 hp	142	186	−23.7
Total 4-wheel drive	**238**	**327**	**−27.2**
Total All Tractors	**7,410**	**7,507**	**−1.3**
S-P Combines	743	1,088	−31.7
Balers (under 200-lb. bales)	319	278	+14.7
Forage Harvesters (shear-bar type)	114	118	− 3.4
Mower-Conditioners	478	450	+ 6.2

Allis-Chalmers Forms New Sales Structure

In a restructuring of its sales organization, Allis-Chalmers Agricultural Equipment Co. has set up area headquarters at Columbus, Ohio, and Kansas City, Mo., with Ed Swingle and Bob Hill as respective sales managers.

The West office has John Behrman as general dealer services manager and Al Paxton as training manager. In the East office, Ben Cornwell and Bob Hayes have those jobs, respectively. The field service organization is centralized in the Milwaukee home office under Doug Williams, general service manager, according to John Johansen, vice-president, North American sales and service.

Ford to Shift Some Production to Europe

Ford Tractor Operations will shift production of farm tractors powered by four- and six-cylinder engines from its plant at Romeo, Mich., to overseas facilities. Three-cylinder farm tractors (in Series 10) and industrial and utility tractors will continue to be made at Romeo.

Six-cylinder farm tractors (TW series) will be made at Antwerp, Belgium, and four-cylinder Series 10 units will be made at Basildon, England. Some production will be transferred by the end of 1985, with the remainder moved in 1986.

Ford reported that about 230 hourly and salaried employees will be affected by the consolidation over the next 18 months. Ford's North American Tractor Operations now has about 3,000 workers.

Recently, Ford Tractor Operations' joint venture company in Mexico, Fabrica de Tractores S.A. (FTA), purchased Agromak S.A., the Mexican licensee of Massey-Ferguson Ltd. It includes a tractor plant in Queretaro and an implement plant near Mexico City. Ford owns 40 per cent of FTA; the other 60 per cent is held by National Financiera S.A., a Mexican government development bank.

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

YODER & FREY, INC.
Archbold, Ohio
January 8, 1985

JOHN DEERE TRACTORS

A, 1935	500
D, 1948 (Rough)	625
G, 1950 (Fair)	450
70 diesel, 1956 (Fair)	970
60,	825
510,	2125
520, 1951 (Fair)	2100*
620,	1420
2010, ldr., 1963 (Rough)	2300*
2010, 1962 (Good)	2100*
2840,	5500
3010, 1965 (Rough)	2300
3020,	6400
3020, 1965 (Fair)	4250*
3020, 1968 (Good)	4900*
3020, 1969 (Fair)	3400*
4010, 1963 (Good)	3575
4010, 1963 (Fair)	3100*
4020, 1967 (Fair)	5750
4020, 1970 (Good)	7600
4020, 1967 (Rough)	3400*
4020, 1966 (Fair)	3450
4020, 1964 (Good)	4850
4020, 1966 (Good)	6800*
4020, 1967 (Fair)	6000
4230, 1974 (Good)	9100
4240, 4WD, 1979 (Good)	15,000*
4430, 1973 (Fair)	10,800
4430, 1974 (Good)	11,250
5020, 1970 (Good)	5750

FERGUSON & MASSEY-FERGUSON

TO-30, (Good)	1200
TO-30, 1952 (Fair)	1075
50, 1959 (Fair)	2400*
50, 1962 (Fair)	1450
85,	510
165 diesel, 1970 (Fair)	3000*
180, 1968 (Fair)	2500*
203, ldr.,	2000
285, 1981 (Fair)	5000*
1085 diesel,	5100
1085, 1977 (Fair)	5250*
1105 diesel, cab, 1978 (Fair)	5600
1135 diesel, 1975 (Fair)	6750*
1150, 1971 (Fair)	4400*
1805, 1974 (Fair)	8750*

MASSEY-HARRIS TRACTOR

44, 1947 (Fair)	375

DEUTZ TRACTORS

D 4506, 1967 (Good)	4375
D60-06, (Good)	4600
D5006, (Fair)	3700*
D7206, (Rough)	2250

CASE TRACTORS

530 diesel, hoe, ldr.,	3300
730 diesel, 1965 (Rough)	900*
730 diesel, 1963 (Rough)	925
730, 1963 (Rough)	1850
770 diesel, 1975 (Fair)	4800*
830 diesel,	2600
830 diesel, 1964 (Fair)	650*
830, 1965 (Rough)	2150
880, 1964 (Rough)	600
930 diesel, 1965 (Fair)	1750*
930, 1964 (Rough)	2300*
950 diesel, 1964 (Rough)	600*
1030 diesel, 1968 (Fair)	2900*
1070 diesel, cab, air, 1975 (Good)	7000*
1270, cab, 1975 (Rough)	4600*
1370 diesel, 1975 (Fair)	6800*
1370 diesel, 1976 (Fair)	6750*
1370, 1976 (Fair)	5900*
1370, cab, air, 1975 (Fair)	6500*
1690, cab, air, 1980 (Good)	12,250*

FORD TRACTORS

8N, 1947 (Fair)	1150*
8N, 1950 (Fair)	1375
8N, (Good)	1525
9N, 1942 (Rough)	750*
9N, 1943 (Fair)	1150
9N, 1942 (Fair)	825
9N, 1941 (Fair)	1080
800, 1956 (Fair)	1280*
850, 1956 (Fair)	2025
2000,	1600
2000, ldr., (Rough)	1650
3000, 1965 (Fair)	2550
3600, 1970 (Fair)	3900*
5000, cab, 1969 (Fair)	3700*
5000 diesel, 1975 (Good)	4800*
6000, (Rough)	1300*
6000 diesel, 1960 (Rough)	1200
8000, 1971 (Rough)	3700*
8000 diesel, 1972 (Fair)	3250*
9000, cab, 1972 (Fair)	5500*
9600, 1975 (Rough)	4100*
3910, (New)	8800*
Jub., 1954 (Rough)	1575*
Jub., ldr., 1952 (Fair)	1525*
Fordson Major, (Fair)	875

INTERNATIONAL HARVESTER TRACTORS

A, 1945 (Rough)	650
A, 1948 (Rough)	700
Cub, cult., 1951 (Fair)	1300
154 Lo-Boy, (Good)	1650*
Sup. C, 1951 (Fair)	750*
H,	260
H, 1950 (Fair)	550*

(More...)

REYE SYNDROME

Reye syndrome is a ***rare but dangerous*** condition that can develop from ***flu or chicken pox.*** It occurs mainly in ***children under 16,*** usually when they ***appear to be recovering.*** Watch for these signs:

- *Persistent vomiting*
- *Fatigue*
- *Confusion and belligerence.*

If your child displays any of these symptoms, ***consult a doctor immediately.***

Some studies indicate that there may be an association between the use of ***aspirin*** for flu and chicken pox and the development of Reye syndrome. Further studies are being conducted on this possibility. In the meantime, the ***U.S. Surgeon General*** suggests that you check with your doctor before using aspirin or any medication when your child has flu or chicken pox.

—A message from the Food and Drug Administration

Auctions
(continued)

H,	375
H, 1942 (Rough)	430
H, 1947 (Fair)	385
H, 1942 (Rough)	550
SH, 1952 (Fair)	650*
M, 1947 (Rough)	450
M,	370
M,	800
M, 1949 (Rough)	475
Sup. M, 1952 (Rough)	900*
Sup. M, 1952 (Good)	1250
Sup. M, 1952 (Fair)	860
200, mo., 1954 (Fair)	1100*
300, ldr., 1957 (Fair)	1100
340, 1959 (Fair)	1200*
414, ldr., (Rough)	850*
460, 1959 (Good)	1100*
460, 1959 (Rough)	1100*
464, ldr., 1975 (Good)	5300
560, 1961 (Good)	1850
560, 1958 (Good)	1800
560, 1960 (Good)	3050
560, 1960 (Good)	2400*
560 diesel, 1960 (Rough)	1260
560 diesel, 1959 (Good)	1875
656 diesel, 1970 (Fair)	3500*
656, 1968 (Fair)	3300*
656, 1970 (Fair)	3600*
68[illegible] diesel, 1976 (Fair)	3250*
684 diesel, 1976 (Fair)	3500*
686, 1976 (Good)	5500
706, 19[illegible] (Fair)	2900
706, 1966 (Fair)	1700*
706, 1964 (Rough)	1950*
756 diesel, cab, 1969 (Good)	5200*
756, 1968 (Fair)	3300*
756, cab, 1970 (Fair)	5500*
766 diesel, 1972 (Fair)	3900
806, 1967 (Fair)	3400*
806 diesel, 1965 (Fair)	4400*
806 diesel, 1965 (Fair)	3600*
856, 1970 (Good)	6000*
856 diesel, 1968 (Fair)	6500*
966, 1974 (Good)	6750*
966, 1972 (Fair)	6500*
966, 1974 (Fair)	6000*
966, 1975 (Good)	6500*
966, cab, 1978 (Excellent)	11,250*
1066, cab, 1975 (Fair)	6250*
1066, 1973 (Fair)	6200*
1066, 1975 (Good)	7000*
1066, 1974 (Fair)	5800*
1086, 1980 (Excellent)	15,000
1086, 1978 (Good)	11,000*
1086, 1978 (Good)	10,850
1206, cab, 1965 (Fair)	4000*
1206, 1964 (Fair)	3700*
1256, 1967 (Fair)	5000*
1256, 1968 (Fair)	5600*
1256, 1969 (Good)	5100*
1456, 1969 (Fair)	4500*
1466, 1974 (Good)	4300*
1466, 1976 (Good)	7000*
1466, 1973 (Fair)	6200*
1486, 1977 (Good)	12,000*
1566, 1974 (Fair)	6800*
1568, 1976 (Good)	4800
1586, 1976 (Rough)	9550*
1586, 1976 (Good)	11,500*
4186,	6000
3588, 1979 (Good)	13,500*

OLIVER TRACTORS

77, 1955 (Rough)	575
88 diesel, 1954 (Fair)	775*
1600, 1962 (Fair)	1600
1650 diesel, cab, 1965 (Good)	4500
1750,	1650
1800, 1965 (Rough)	1500*
1800 diesel, 1963 (Fair)	1850*
1850, 1965 (Fair)	4250
1850 diesel, 1967 (Fair)	3500*
1850, 1967 (Fair)	3300
1955 diesel, 1972 (Good)	5250*
2-70, (Good)	7300
2-105, (Fair)	6100*

ALLIS-CHALMERS TRACTORS

B, 1949 (Fair)	475
G, 1949 (Fair)	900*
WC, bld.,	280
D-17, 1964 (Fair)	1450
D-17, 1966 (Fair)	1900
D-17, ldr., 1965 (Fair)	2325*
D-19, 19[illegible]7 (Fair)	1550
190XT diesel, 1970 (Fair)	3675
7000 diesel, cab, air, (Good)	6750*
7030, 1976 (Fair)	5100*
7050, 1977 (Fair)	5500*

MINNEAPOLIS-MOLINE TRACTORS

445 diesel, (Rough)	725*
M-670 LP, 1966 (Fair)	975
G-1000 Vista, (Rough)	3700
A 4T-1400, (Rough)	4500*
U	235
Z	260
ZB, 1946 (Rough)	420

JONES FARM EQUIPMENT CO., INC.
Dothan, Alabama
January 8, 1985

ALLIS-CHALMERS TRACTORS

7030, cab, 1974 (Good)	6300*
5050 diesel, 1977 (Fair)	3100*

CASE TRACTORS

2090 diesel, cab, 1981 (Good)	12,000*
1370 diesel, cab, 1976 (Good)	8000*
1030 diesel, 1968 (Rough)	1475
900 diesel, 1958 (Rough)	310
830 diesel, 1967 (Rough)	2200*

MASSEY-FERGUSON TRACTORS

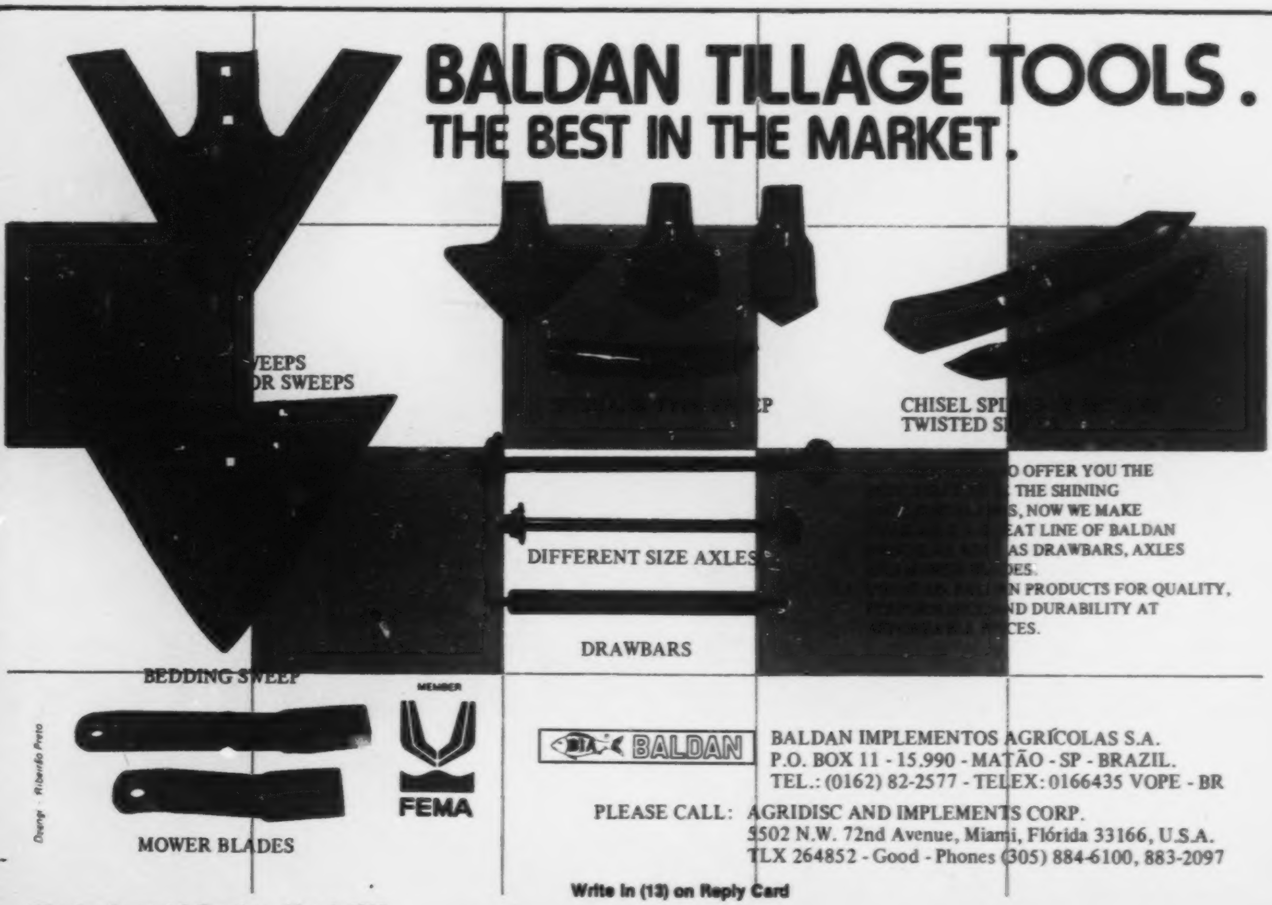
1085 diesel, 1977 (Good)	4000
285 diesel, 1975 (Good)	5950*
265 diesel, 1975 (Good)	5100
255 diesel, 1976 (Good)	4650
245 diesel, 1976 (Good)	5000*
235 diesel, 1975 (Good)	4100
235 diesel, 1975 (Good)	3900
235 diesel, 1975 (Good)	4050
165 diesel, 1973 (Good)	4050
165 diesel, 1966 (Fair)	3000
135 diesel, 1974 (Good)	3300
135 diesel, 1973 (Good)	3550
135 diesel, 1972 (Excellent)	4000*
135 diesel, 1972 (Excellent)	3950
135, 1969 (Good)	3200
135, 1967 (Good)	2900
135 diesel, 1966 (Good)	3000
135 diesel, 1966 (Fair)	2600*
135, 1966 (Good)	3150
35, 1963 (Good)	2050
35, 1963 (Rough)	900
35, 1958 (Excellent)	2325
35, 1956 (Excellent)	2500
35, 1956 (Good)	1900
TO30, 1952 (Good)	1300
TO20, 1949 (Good)	1150

FORD-FERGUSON TRACTOR

9N, 1944 (Good)	925

FORD TRACTORS

9600 diesel, 1976 (Good)	5300*
8700 diesel, 1976 (Good)	6500*
7600 diesel, cab, 1975 (Excellent)	6950
7600 diesel, 1975 (Excellent)	6500*



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6700 diesel, 1977 (Fair)	5250*
6600 diesel, cab, 1976 (Excellent)	6950
6600 diesel, 1975 (Good)	5500
5600 diesel, cab, 1977 (Good)	6050
5000 diesel, bld, 1967 (Rough)	1950*
4600 diesel, 1976 (Excellent)	6500*
4100 diesel, (Good)	5000*
3610 diesel, 1980 (Good)	6700*
3600 diesel, cab, 1975 (Good)	4400
3600, 1975 (Good)	4100*
3000 diesel, ldr., 1974 (Good)	3850
3000 diesel, 1974 (Fair)	3250
3000 diesel, 1970 (Fair)	3250
3000 diesel, 1970 (Rough)	1350*
3000 diesel, 1969 (Good)	3275
3000 diesel, 1969 (Good)	3400
3000 diesel, 1968 (Good)	2900
3000 diesel, 1968 (Good)	3000
3000 diesel, 1968 (Good)	3150
3000 diesel, 1968 (Good)	2975
3000 diesel, 1967 (Excellent)	3750*
3000 diesel, 1967 (Good)	3250
2600 diesel, 1979 (Excellent)	5300*
2600 diesel, 1976 (Good)	4300
2000, 1969 (Excellent)	4575
2000, 1971 (Good)	3500
2000 diesel, (Fair)	2600*
2000 diesel, 1966 (Rough)	1900*
2000 diesel, 1966 (Fair)	2500
861, 1959 (Good)	2250
850, 1956 (Good)	1725
850, 1956 (Fair)	1350
641, 1961 (Good)	2325
641, 1959 (Good)	2150
620, 1960 (Good)	1600
611, 1959 (Good)	1900
Dexta, 1959 (Fair)	1000
Dexta, 1958 (Rough)	650
Jub., 1953 (Excellent)	2050
Jub., 1953 (Good)	1650
8N, 1952 (Good)	1550
8N, 1952 (Good)	1450*
8N, 1952 (Good)	1600
8N, 1951 (Fair)	1350
8N, 1951 (Good)	1700
8N, 1951 (Good)	1500
8N, plow, cult., 1949 (Good)	1900
8N, 1949 (Fair)	1350
8N, 1948 (Fair)	900
8N, 1948 (Good)	1450
8N, 1948 (Fair)	1300
8N, 1948 (Rough)	750*

INTERNATIONAL HARVESTER TRACTORS

1206 diesel, 1967 (Rough)	2400*
966 diesel, cab, 1976 (Good)	6000
784 diesel, cab, 1978 (Excellent)	6900
784 diesel, cab, 1978 (Excellent)	6450
684 diesel, cab, 1978 (Excellent)	6150
B414 diesel, 1962 (Good)	1750
200, 1954 (Fair)	550
Sup. C, 1948 (Good)	525
Sup. A, 1952 (Good)	1300
Cub, 1952 (Excellent)	1500
Cub, 1950 (Good)	1250
Cub, mo., 1948 (Good)	1050*
Cub, 1948 (Rough)	480

JOHN DEERE TRACTORS

4440 diesel, cab, 1979 (Excellent)	18,500*
4430 diesel, 1976 (Excellent)	11,000*
4430 diesel, 1976 (Good)	8000
4430 diesel, 1973 (Excellent)	10,000*
4230 diesel, cab, 1976 (Excellent)	10,000
4230 diesel, 1974 (Excellent)	9600*
4020 diesel, 1967 (Fair)	4100*
4020 diesel, 1966 (Rough)	2100
2840 diesel, 1979 (Excellent)	8100*
2840 diesel, 1979 (Rough)	4100*
2840 diesel, 1977 (Good)	6400*
2130 diesel, cab, (Good)	4300
2130 diesel, (Fair)	3100*
2030 diesel, 1973 (Good)	4000
2010, 1963 (Rough)	650
2010 diesel, 1962 (Fair)	1450*
1020 diesel, 1970 (Good)	3050
20 diesel, 1972 (Good)	2700*
720 diesel, 1956 (Fair)	700*

OLIVER TRACTOR

1250 diesel, 1966 (Fair)	1000

NOTES:
Prices reported are for individual sales at wholesale on an "as is," "cash and carry" basis. Prices reported are not averages.

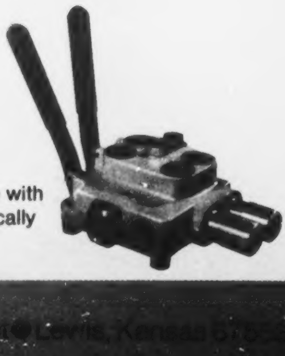
Condition Classifications:

EXCELLENT: Engine in perfect condition, 400 to 600 hours of use. Rubber—80% tread remaining, no breaks or cracks. Paint—original and bright. General appearance: excellent.

GOOD: Engine in good running condition. Rubber—70% tread remaining, no breaks or cracks. Paint—original or a good repaint job. General appearance: good over-all.

FAIR: Engine possibly in need of a minor overhaul. Rubber—60% tread remaining, some cracking evident in sidewalls. Paint—only fair, weathered and some rust apparent. General appearance: worn, some dents, minor parts (gage covers, etc.) missing or broken.

ROUGH: Engine obviously in need of a major overhaul. Rubber—smooth. Paint—scarred, weathered, rusty. General appearance: dents, ruptures, broken parts, loose wires, components (such as lights) broken, missing or inoperative.



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Implement & Tractor

The business magazine of the farm and industrial equipment industry

March 31, 1985

RED BOOK

Tractor and equipment specifications

Hydraulic components data

Nebraska test reports

Full contents page 4-5

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Index of 1984 Tractor Test Reports

Tractor Make & Model	Test No.	Page No.
CASE		
1594 Synchro 12 Speed	1546	88
1594 Powershift 12 Speed	1547	90
2094 Powershift 12 Speed	1525	92
2294 Powershift 12 Speed	1526	93
2394 Powershift 24 Speed	1527	94
2594 Powershift 24 Speed	1529	96
3294 Powershift 12 Speed	1528	98
4994 Powershift 12 Speed	1530	99
FORD		
1910 Manual 12 Speed	1507	100
1910 Synchro 12 Speed	1508	101
2110 Manual 12 Speed	1509	102
2110 Synchro 12 Speed	1510	103
TW-5 16 Speed	1514	104
TW-15 16 Speed	1515	106
TW-15 FWD 16 Speed	1536	108
TW-25 16 Speed	1516	110
TW-35 16 Speed	1517	112
TW-35 FWD 16 Speed	1537	114
MASSEY-FERGUSON		
240 8 Speed	1519	116
250 8 Speed	1520	117
270 8 Speed	1521	118
290 12 Speed	1522	119
298 8 Speed	1523	120
298 12 Speed	1524	121
670 12 Speed	1538	122
690 12 Speed	1539	124
698 12 Speed	1540	126
699 12 Speed	1541	128
3505 16 Speed	1511	130
3525 16 Speed	1512	131
3545 16 Speed	1513	132
VERSATILE		
256 Hydrostatic	1518	133
1974-1984 Summary		136

The Nebraska Tractor Test Law

Purpose of the Law—The Nebraska Tractor Test Law originated in 1919 for the purpose of verifying advertising claims on tractors offered for sale to Nebraska farmers.

Its position as the only independent test laboratory in the United States devoted to the evaluation of tractor performance proved of unique value to the industry. The Agricultural Tractor Test Code used in the Nebraska Tests was developed with the approval and assistance of the American Society of Agricultural Engineers and the Society of Automotive Engineers, and is revised and updated periodically as the need arises. The Test Code (ASAE S209.4 or SAE J708c) is published in the ASAE Yearbook and SAE Handbook.

Provisions of the Law—Stated briefly, the Nebraska Tractor Test Law provides:

That a stock unit of each agricultural tractor model sold in Nebraska shall be tested and passed upon by a board of three engineers under the supervision and direction of the University of Nebraska. Each tractor must be certified as a stock model and will be equipped with the common power consuming accessories. An official representative of the manufacturer is present during the test to see that the performance meets company standards.

The Department of Agriculture shall deny to any manufacturer the right to do business in the State on complaint of two or more bona fide customers that the company has failed to maintain an adequate service station with a full supply of replacement parts within the state and within reasonable distance of customers.

The law further states that it shall be unlawful to publish excerpts from any official test in advertising material without publishing the entire report.

The provisions of the Nebraska Test Law do not apply to any tractor the engine of which develops less than 20 horsepower; or to tractors manufactured, sold and used for heavy construction when identical units are not sold and used for agricultural purposes.

Explanation of Test Reports

General

Tractors are tested at the University of Nebraska according to the Agricultural Tractor Test Code approved by the American Society of Agricultural Engineers and the Society of Automotive Engineers or official Nebraska test procedure.

The manufacturer selects the tractor to be tested and certifies that it is a stock model. Each tractor is equipped with the common power consuming accessories such as power steering, power lift pump, generator, etc., if available. Power consuming accessories may be disconnected only when the means for disconnecting can be reached from the operating station. An official representative of the company is present during the test to see that the tractor gives its optimum performance. Additional weight may be added to the tractor as ballast if the manufacturer recommends use of such ballast. The static tire loads and the tire inflation pressures must conform to the specifications of Tire and Rim Association.

Preparation for Test

The engine crankcase is drained and refilled with new oil conforming to specifications in the operator's manual. The operator's manual is also used as the guide for selecting the proper fuel and for routine lubrication and maintenance operations.

The tractor is limbered up for a minimum of three hours on the drawbar. Preliminary adjustment of the tractor is permitted at this time. Any parts added or replaced during the limber-up run, or any subsequent runs, are mentioned in the individual test reports. The tractor is equipped with approximately the amount of added ballast that is to be used during the drawbar runs.

PTO Performance

Power take-off performance runs are made by connecting the power take-off to a dynamometer. During a preliminary power take-off run the manufacturer's representative may make adjustment for the fuel, ignition or injection timing and governor control settings. These settings must be maintained for the remainder of the test. The manually operated governor control mechanism is set to provide the high-idle speed specified by the manufacturer. During the power take-off runs an ambient air temperature of approximately 75°F. (24.0°C) is maintained.

Maximum power is obtained at the rated engine speed specified by the manufacturer with the governor control lever set for maximum power. This same setting is used for all subsequent PTO runs. Time of the run is two hours. Whenever the power take-off speed during the maximum power run differs from the speeds set forth in the ASAE and SAE standards, an additional run is made at either 540 or 1000 rpm of the power take-off shaft. Time of this run is one hour.

Drawbar Performance

Maximum drawbar power is shown for the normal field speed selected by the manufacturer. All engine adjustments are the same as those used in the power take-off runs. If the manufacturer specifies a different rated engine speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified.

Maximum drawbar power is determined within the following limits: (1) slip of the drivers must not exceed 15% for pneumatic tires on the concrete test course or 7% for steel cleats on the well packed earthen test course, (2) ground speeds must not exceed 10 miles per hour, (3) safe stability limits of the tractor must not be exceeded, (4) no other operating limit of the tractor must be exceeded. Drawbar load is applied until the manufacturer's rated engine speed is obtained with maximum governor control lever setting. Travel speed, drawbar pull and other data are recorded over two 500-foot straight level areas.

Fuel consumption is determined at the manufacturer's selected travel speed with the drawbar pull set: (1) to give rated engine rpm, (2) 75% of the pull at rated engine rpm, (3) 50% of the pull at rated engine rpm, and (4) maintaining the same load and travel speed as in (3) by shifting to a higher gear and reducing the engine rpm.

This summary shows the drawbar horsepower, corresponding travel speed and fuel consumption at 100%, 75% or 50% loads, and 50% of pull at reduced engine speed.

Also shown is the maximum drawbar horsepower produced for two 500-foot travel sections and corresponding travel speed, the maximum drawbar pull and the corresponding drive-wheel slippage.

In addition, the "lugging ability" obtained by increasing the load so that the full throttle engine speed drops to 80% of rated is given as a percent increase with respect to the pull at rated engine rpm.

The maximum drawbar horsepower and the corresponding speed and drawbar pull for other selected gears or travel speeds are shown in the individual test reports.

Sound Measurement

Sound is recorded during each of the Drawbar Performance runs as the tractor travels on a straight section of the test course. The dB(A) sound level is obtained with the microphone located near the right ear of the operator. Bystander sound readings are taken with the microphone placed 25 feet (7.5 m) from the line of travel of the tractor. An increase of 10dB(A) will approximately double the loudness to the human ear.

Individual copies of any test report, annual summary booklets or annual subscription (at $4.50) are available. For complete information write to **Department of Agricultural Engineering, University of Nebraska—Lincoln, Lincoln, Nebraska 68583.**

NEBRASKA TRACTOR TEST 1546—CASE 1594 SYNCHROMESH DIESEL 12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank-shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1123 rpm)								
85.90 (64.06)	2300	5.178 (19.600)	0.421 (0.256)	16.59 (3.268)	192 (88.9)	64 (17.8)	75 (24.1)	28.70 (97.20)
Standard Power Take-off Speed (1000 rpm)—One Hour								
80.83 (60.28)	2048	4.744 (17.959)	0.410 (0.249)	17.04 (3.357)	192 (89.0)	64 (17.8)	75 (24.1)	28.74 (97.33)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
75.08 (55.99)	2364	4.555 (17.240)	0.424 (0.258)	16.48 (3.247)	191 (88.3)	64 (17.8)	76 (24.2)	…… ……
0.00 (0.00)	2425	1.371 (5.190)	…… ……	…… ……	186 (85.3)	63 (16.9)	75 (23.6)	…… ……
38.24 (28.51)	2409	2.832 (10.718)	0.517 (0.315)	13.50 (2.660)	187 (86.1)	63 (17.2)	74 (23.3)	…… ……
86.38 (64.41)	2300	5.186 (19.631)	0.419 (0.255)	16.66 (3.281)	192 (88.9)	63 (17.2)	74 (23.3)	…… ……
19.18 (14.30)	2414	2.084 (7.888)	0.759 (0.461)	9.20 (1.813)	187 (85.8)	63 (17.2)	74 (23.3)	…… ……
56.96 (42.48)	2387	3.614 (13.679)	0.444 (0.270)	15.75 (3.103)	188 (86.7)	63 (17.2)	74 (23.1)	…… ……
Av 45.96 Av (34.27)	2383	3.273 (12.391)	0.497 (0.302)	14.04 (2.766)	188 (86.9)	63 (17.3)	74 (23.5)	28.70 (96.92)

The following performance figures apply to tractors after chassis S/N 11221501.

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th (L2) Gear											
72.17 (53.82)	5115 (22.74)	5.29 (8.52)	2300	6.98	5.063 (19.166)	0.490 (0.298)	14.26 (2.808)	191 (88.1)	38 (3.4)	47 (8.3)	29.19 (98.85)
75% of Pull at Maximum Power—Ten Hours 7th (L2) Gear											
58.81 (43.86)	3911 (17.40)	5.64 (9.08)	2401	5.09	4.338 (16.422)	0.515 (0.313)	13.56 (2.671)	191 (88.1)	29 (−1.5)	33 (0.6)	29.20 (98.87)
50% of Pull at Maximum Power—Two Hours 7th (L2) Gear											
40.25 (30.02)	2608 (11.60)	5.79 (9.32)	2424	3.54	3.359 (12.714)	0.585 (0.354)	11.98 (2.361)	191 (88.1)	37 (2.8)	44 (6.7)	29.18 (98.82)
50% of Pull at Reduced Engine Speed—Two Hours 10th (L3) Gear											
40.23 (30.00)	2610 (11.61)	5.78 (9.30)	1403	3.65	2.700 (10.220)	0.469 (0.285)	14.90 (2.935)	187 (86.1)	43 (6.1)	44 (6.7)	28.90 (97.87)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
67.33 (50.21)	8331 (37.06)	3.03 (4.88)	2354	14.64	4th (L1) Gear	191 (88.1)	35 (1.7)	39 (3.9)	29.23 (98.71)
69.32 (51.69)	7581 (33.72)	3.43 (5.52)	2299	11.67	5th (LS3) Gear	190 (87.5)	36 (2.2)	40 (4.4)	29.24 (98.74)
70.59 (52.64)	6484 (28.85)	4.08 (6.56)	2301	9.27	6th (HS2) Gear	190 (87.8)	36 (2.2)	41 (5.0)	29.23 (98.71)
73.54 (54.84)	5215 (23.20)	5.29 (8.51)	2300	7.08	7th (L2) Gear	191 (88.1)	39 (3.9)	46 (7.8)	29.20 (98.60)
72.94 (54.52)	4180 (18.63)	6.52 (10.50)	2299	5.65	8th (H1) Gear	190 (87.8)	37 (2.8)	42 (5.6)	29.25 (98.71)
70.77 (52.77)	3596 (16.00)	7.38 (11.88)	2300	4.78	9th (HS3) Gear	190 (87.5)	37 (2.8)	43 (6.1)	29.22 (98.67)
70.01 (52.21)	2778 (12.35)	9.45 (15.21)	2290	3.76	10th (L3) Gear	190 (87.5)	37 (2.8)	44 (6.7)	29.22 (98.67)

Department of Agricultural Engineering

Dates of Test: October 24 to November 2, 1984

Manufacturer: J. I. CASE COMPANY, 700 State Street, Racine, Wisconsin 53404

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.8 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60° F** *(15/15°C)* 0.8385 **Fuel weight** 6.982 lbs/gal *(0.837 kg/l)* **Oil SAE** 30 **API service classification** SF-CD **To motor** 3.090 gal *(11.698 l)* **Drained from motor** 2.572 gal *(9.735 l)* **Transmission and hydraulic lubricant** Case TFD fluid **Final drive lubricant** Case ETHB fluid **Total time engine was operated** 36.5 hours.

ENGINE: **Make** Case Diesel **Type** six cylinder vertical **Serial No.** 330002 11465511 **Crankshaft** lengthwise **Rated rpm** 2300 **Bore and stroke** 3.939" × 4.500" *(100 mm × 114.3 mm)* **Compression ratio** 16 to 1 **Displacement** 329 cu in *(5392 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and centrifugal precleaner **Oil filter** one full flow cartridge **Fuel filter** two paper elements with sediment bowl and screen **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** standard **Serial No.** *154/BEB/11219518* **Tread width** rear 61" *(1549 mm)* to 85" *(2159 mm)* front 60" *(1524 mm)* to 88" *(2235 mm)* **Wheel base** 100" *(2540 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 33.2" *(842 mm)* Vertical distance above roadway 36.7" *(932 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph (km/h)** first 1.4 *(2.3)* second 2.3 *(3.7)* third 2.8 *(4.5)* fourth 3.5 *(5.6)* fifth 3.9 *(6.3)* sixth 4.5 *(7.2)* seventh 5.7 *(9.2)* eighth 6.9 *(11.1)* ninth 7.8 *(12.6)* tenth 9.9 *(15.9)* eleventh 11.4 *(18.3)* twelfth 19.7 *(31.7)* reverse 2.3 *(3.7)*, 4.6 *(7.4)*, 5.8 *(9.3)*, 11.6 *(18.7)* **Clutch** single dry disc hydraulically actuated by foot pedal **Brakes** multiple wet disc hydraulically operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 148" *(3.76 m)* left 148" *(3.76 m)* (on concrete surface without brake) right 176" *(4.47 m)* left 176" *(4.47 m)* **Turning space diameter** (on concrete surface with brake applied) right 309" *(7.85 m)* left 309" *(7.85 m)* (on concrete surface without brake) right 364" *(9.25 m)* left 364" *(9.25 m)* **Power take-off** 540 rpm at 2077 engine rpm and 1000 rpm at 2048 engine rpm **Unladen tractor mass** 9170 lb *(4160 kg)*.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

LUGGING ABILITY IN 7th (L2) GEAR

Crankshaft Speed rpm	2300	2070	1837	1610	1373	1148	914
Pull—lbs (kN)	5215 (23.20)	5572 (24.79)	5888 (26.20)	6086 (27.07)	6083 (27.06)	6090 (27.09)	5823 (25.90)
Increase in Pull %	0	7	13	17	17	17	12
Power—Hp (kW)	73.54 (54.84)	70.31 (52.43)	65.84 (49.10)	59.21 (44.15)	50.46 (37.63)	42.21 (31.48)	32.29 (24.08)
Speed—Mph (km/h)	5.29 (8.51)	4.73 (7.62)	4.18 (6.73)	3.65 (5.87)	3.11 (5.01)	2.60 (4.18)	2.08 (3.35)
Slip %	7.08	7.56	8.00	8.35	8.35	8.49	8.00

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Maximum Available Power—Two Hours	85.0
75% of Pull at Maximum Power—Ten Hours	82.0
50% of Pull at Maximum Power—Two Hours	83.5
50% of Pull at Reduced Engine Speed—Two Hours	78.5
Bystander in 11th (H2) gear	86.0

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 18.4-34; 6; 16 *(110)*	Two 18.4-34; 6; 16 *(110)*
Ballast	—Liquid (each)	582 lb *(264 kg)*	None
	—Cast Iron (each)	205 lb *(93 kg)*	None
Front Tires	—No., size, ply & psi (kPa)	Two 10.00-16; 8; 44 *(303)*	Two 10.00-16; 8; 44 *(303)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	90 lb *(41 kg)*	None
Height of Drawbar		20 in *(510 mm)*	20 in *(510 mm)*
Static Weight with Operator	—Rear	7880 lb *(3574 kg)*	6085 lb *(2760 kg)*
	—Front	3220 lb *(1461 kg)*	3040 lb *(1379 kg)*
	—Total	11100 lb *(5035 kg)*	9125 lb *(4139 kg)*

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi (kPa) Location	2325 lift cylinder	*16030*	
Hydraulic oil temperature °F (°C) Location	170 drain plug	77	
	Maximum Lift Capacity		Lift Capacity for Transport
QUICK ATTACH CATEGORY	no II		*not measured
LOAD lbs (kg) TIME sec	6002 2.78	*2723*	
HITCH POINT MOVEMENT in (mm)			
Lowest position	12.0	*305*	
Top of timed range	36.0	*914*	
Highest position	36.0	*914*	
LOAD CG MOVEMENT in (mm)			
Lowest position	11.9	*303*	
Top of timed range	36.4	*924*	
Highest position	36.2	*919*	

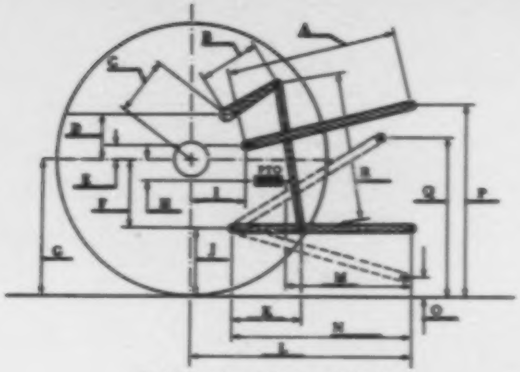
*Implement load capacity for transport purposes not specified by manufacturer.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 170°F *(76.6°C)*. Seven gears were chosen between 15% slip and 10 mph *(16.1 km/h)*. The drawbar performance figures on this report apply to tractors after chassis S/N 11221501.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1546, December 3, 1984.

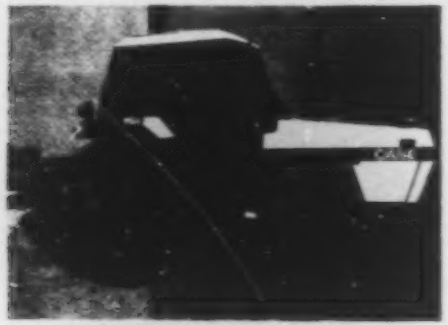
LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Hitch Dimensions as Tested — No Load

	inch	mm
A	30.1	765
B	9.5	241
C	10.2	259
D	10.1	257
E	11.4	289
F	7.9	200
G	28.8	732
H	-0.4	-10
I	7.0	178
J	13.1	332
K	19.0	483
L	38.0	965
M	25.2	641
N	38.0	965
O	8.0	203
P	40.8	1035
Q	33.6	854
R	24.8	629



Case 1594 Synchromesh Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1547—CASE 1594 POWERSHIFT DIESEL
12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1123 rpm)								
85.54 *(63.79)*	2300	5.232 *(19.805)*	0.427 *(0.260)*	16.35 *(3.221)*	193 *(89.4)*	69 *(20.5)*	75 *(24.0)*	29.03 *(98.03)*
Standard Power Take-off Speed (1000 rpm)—One Hour								
81.94 *(61.11)*	2048	4.861 *(18.399)*	0.414 *(0.252)*	16.86 *(3.321)*	193 *(89.5)*	70 *(20.9)*	76 *(24.5)*	29.01 *(97.96)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
73.96 *(55.15)*	2339	4.509 *(17.071)*	0.433 *(0.264)*	16.12 *(3.175)*	190 *(87.5)*	68 *(20.0)*	73 *(22.8)*	....
0.00 *(0.00)*	2449	1.461 *(5.530)*	....	....	185 *(85.0)*	68 *(20.0)*	73 *(22.8)*	....
38.07 *(28.39)*	2407	2.922 *(11.060)*	0.536 *(0.326)*	13.03 *(2.567)*	186 *(85.6)*	68 *(20.0)*	74 *(23.1)*	....
85.16 *(63.50)*	2290	5.246 *(19.859)*	0.430 *(0.262)*	16.23 *(3.198)*	192 *(88.9)*	69 *(20.6)*	74 *(23.3)*	....
19.14 *(14.27)*	2425	2.204 *(8.344)*	0.804 *(0.489)*	8.68 *(1.711)*	185 *(85.0)*	69 *(20.6)*	75 *(23.6)*	....
56.20 *(41.91)*	2371	3.730 *(14.118)*	0.463 *(0.282)*	15.07 *(2.969)*	187 *(86.1)*	68 *(20.0)*	74 *(23.1)*	....
Av 45.42 *Av (33.87)*	2381	3.359 *(12.713)*	0.516 *(0.314)*	13.52 *(2.664)*	187 *(86.3)*	68 *(20.2)*	74 *(23.1)*	29.00 *(97.93)*

The following performance figures apply to tractors after chassis S/N 11221501.

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th (2-3) Gear											
69.37 *(51.73)*	4766 *(21.20)*	5.46 *(8.78)*	2300	6.81	5.106 *(19.328)*	0.514 *(0.313)*	13.59 *(2.676)*	192 *(88.9)*	60 *(15.6)*	65 *(18.6)*	28.48 *(96.16)*
75% of Pull at Maximum Power—Ten Hours 7th (2-3) Gear											
55.94 *(41.71)*	3627 *(16.13)*	5.78 *(9.31)*	2383	4.79	4.271 *(16.167)*	0.533 *(0.324)*	13.10 *(2.580)*	189 *(87.0)*	46 *(7.7)*	55 *(12.7)*	28.97 *(97.83)*
50% of Pull at Maximum Power—Two Hours 7th (2-3) Gear											
38.14 *(28.44)*	2422 *(10.77)*	5.91 *(9.50)*	2397	3.29	3.330 *(12.605)*	0.610 *(0.371)*	11.45 *(2.256)*	188 *(86.7)*	59 *(14.7)*	66 *(18.9)*	28.48 *(96.17)*
50% of Pull at Reduced Engine Speed—Two Hours 10th (3-2) Gear											
38.30 *(28.56)*	2421 *(10.77)*	5.93 *(9.53)*	1501	3.18	2.764 *(10.464)*	0.504 *(0.307)*	13.85 *(2.729)*	188 *(86.7)*	58 *(14.2)*	65 *(18.1)*	28.50 *(96.22)*
MAXIMUM POWER IN SELECTED GEARS											
62.14 *(46.34)*	8198 *(36.47)*	2.84 *(4.57)*	2332	14.98	4th (2-1) Gear			190 *(87.8)*	61 *(16.1)*	64 *(17.8)*	28.46 *(96.11)*
65.25 *(48.65)*	7528 *(33.48)*	3.25 *(5.23)*	2290	12.51	5th (1-4) Gear			192 *(88.6)*	58 *(14.4)*	68 *(20.0)*	28.67 *(96.81)*
68.10 *(50.78)*	6250 *(27.80)*	4.09 *(6.58)*	2299	9.12	6th (2-2) Gear			193 *(89.2)*	59 *(15.0)*	69 *(20.6)*	28.72 *(96.98)*
70.59 *(52.64)*	4842 *(21.54)*	5.47 *(8.80)*	2290	6.64	7th (2-3) Gear			192 *(88.9)*	59 *(15.0)*	68 *(20.0)*	28.68 *(96.85)*
69.11 *(51.54)*	3989 *(17.74)*	6.50 *(10.46)*	2299	5.38	8th (3-1) Gear			193 *(89.2)*	59 *(15.0)*	69 *(20.6)*	28.71 *(96.95)*
69.13 *(51.55)*	3394 *(15.10)*	7.64 *(12.29)*	2298	4.60	9th (2-4) Gear			192 *(88.9)*	59 *(15.0)*	69 *(20.6)*	28.70 *(96.92)*
67.74 *(50.51)*	2807 *(12.48)*	9.05 *(14.57)*	2290	3.50	10th (3-2) Gear			192 *(88.9)*	59 *(15.0)*	69 *(20.6)*	28.69 *(96.88)*

Department of Agricultural Engineering

Dates of Test: October 23 to 30, 1984

Manufacturer: J. I. CASE COMPANY, 700 State Street, Racine, Wisconsin 53404

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.8 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60° F** *(15/15°C)* 0.8385 **Fuel weight** 6.982 lbs/gal *(0.837 kg/l)* **Oil SAE** 30 **API service classification** SF-CD **To motor** 3.060 gal *(11.584 l)* **Drained from motor** 2.574 gal *(9.744 l)* **Transmission and hydraulic lubricant** Case TFD fluid **Final drive lubricant** Case ETHB fluid **Total time engine was operated** 37.0 hours.

ENGINE: **Make** Case Diesel **Type** six cylinder vertical **Serial No.** 530002 11465518 **Crankshaft** lengthwise **Rated rpm** 2300 **Bore and stroke** 3.939" × 4.500" *(100 mm × 114.3 mm)* **Compression ratio** 16 to 1 **Displacement** 329 cu in *(5392 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and centrifugal precleaner **Oil filter** one full flow cartridge **Oil cooler** radiator for hydraulic and transmission oil **Fuel filter** two paper elements with sediment bowl and screen **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** standard **Serial No.** *154/BJD/11219781* **Tread width** rear 61" *(1549 mm)* to 85" *(2159 mm)* front 60" *(1524 mm)* to 88" *(2235 mm)* **Wheel base** 100" *(2540 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 33.6" *(853 mm)* Vertical distance above roadway 36.7" *(932 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (4) range operator controlled powershift **Advertised speeds mph** *(km/h)* first 1.5 *(2.4)* second 2.1 *(3.4)* third 2.7 *(4.4)* fourth 3.3 *(5.3)* fifth 3.7 *(6.0)* sixth 4.5 *(7.2)* seventh 5.9 *(9.5)* eighth 6.9 *(11.1)* ninth 8.0 *(12.9)* tenth 9.4 *(15.1)* eleventh 12.3 *(19.8)* twelfth 16.7 *(26.9)* reverse 3.5 *(5.6)*, 4.8 *(7.7)*, 6.3 *(10.1)*, 8.6 *(13.8)* **Clutch** single dry disc hydraulically actuated by foot pedal **Brakes** multiple wet disc hydraulically operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 148" *(3.76 m)* left 148" *(3.76 m)* (on concrete surface without brake) right 176" *(4.47 m)* left 176" *(4.47 m)* **Turning space diameter** (on concrete surface with brake applied) right 309" *(7.85 m)* left 309" *(7.85 m)* (on concrete surface without brake) right 364" *(9.25 m)* left 364" *(9.25 m)* **Power take-off** 540 rpm at 2077 engine rpm and 1000 rpm [illegible] 2048 engine rpm **Unladen tractor mass** 9290 lb *(4214 kg)*.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

LUGGING ABILITY IN 7th (2-3) GEAR

Crankshaft Speed rpm	2290	2072	1836	1606	1374	1145
Pull—lbs *(kN)*	4842 *(21.54)*	5326 *(23.69)*	5594 *(24.88)*	5724 *(25.46)*	5748 *(25.56)*	5713 *(25.41)*
Increase in Pull %	0	10	16	18	19	18
Power—Hp *(kW)*	70.59 *(52.64)*	69.37 *(51.73)*	64.26 *(47.92)*	57.36 *(42.78)*	49.23 *(36.71)*	40.80 *(30.43)*
Speed—Mph *(km/h)*	5.47 *(8.80)*	4.88 *(7.86)*	4.31 *(6.93)*	3.76 *(6.05)*	3.21 *(5.17)*	2.68 *(4.31)*
Slip %	6.64	7.46	7.86	8.26	8.15	8.13

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Maximum Available Power—Two Hours	80.5
75% of Pull at Maximum Power—Ten Hours	82.5
50% of Pull at Maximum Power—Two Hours	83.5
50% of Pull at Reduced Engine Speed—Two Hours	80.5
Bystander in 12th (3-4) gear	88.5

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 18.4-34; 6; 16 *(110)*	Two 18.4-34; 6; 16 *(110)*
Ballast	—Liquid (each)	478 lb *(217 kg)*	None
	—Cast Iron (each)	336 lb *(152 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 10.00-16; 8; 44 *(305)*	Two 10.00-16; 8; 44 *(305)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	60 lb *(27 kg)*	None
Height of Drawbar		20 in *(510 mm)*	20 in *(510 mm)*
Static Weight with Operator	—Rear	7970 lb *(3615 kg)*	6345 lb *(2878 kg)*
	—Front	3240 lb *(1470 kg)*	3120 lb *(1415 kg)*
	—Total	11210 lb *(5085 kg)*	9465 lb *(4293 kg)*

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi *(kpa)*	2350	*16200*	
Location	lift cylinder		
Hydraulic oil temperature °F (°C)	169	76	
Location	drain plug		
	Maximum Lift Capacity		Lift Capacity for Transport
QUICK ATTACH	no		
CATEGORY	II		*not measured
LOAD lbs (kg)	6002	*2723*	
TIME sec	2.63		
HITCH POINT MOVEMENT in (mm)			
Lowest position	13.3	*337*	
Top of timed range	**36.3	*921*	
Highest position	36.5	*927*	
LOAD CG MOVEMENT in (mm)			
Lowest position	12.6	*319*	
Top of timed range	35.9	*913*	
Highest position	36.3	*922*	

*Implement load capacity for transport purposes not specified by manufacturer.

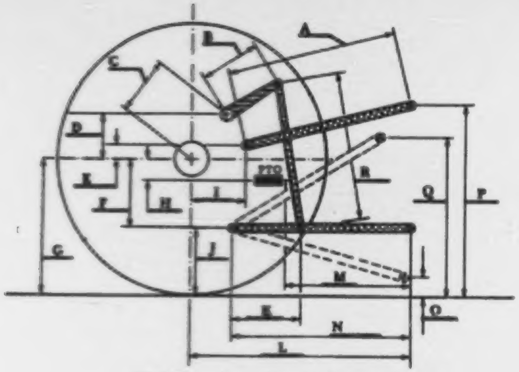
**The observed power range 23.2" (590 mm) does not meet the minimum power range 24" (610 mm) specified by ASAE Standard S217.10

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 179°F *(81.9°C)*. Seven gears were chosen between 15% slip and 10 mph *(16.1 km/h)*. The drawbar performance figures on this report apply to tractors after chassis S/N 11221501.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1547, December 3, 1984.

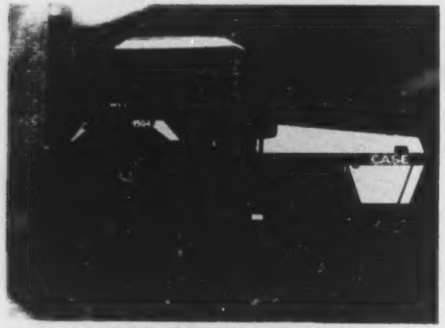
LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Hitch Dimensions as Tested — No Load

	inch	mm
A	30.6	*778*
B	9.5	*241*
C	10.2	*258*
D	10.1	*257*
E	11.4	*289*
F	7.9	*200*
G	29.4	*746*
H	–0.4	*–10*
I	7.0	*178*
J	21.5	*546*
K	19.0	*483*
L	38.0	*965*
M	25.2	*641*
N	38.0	*965*
O	8.0	*203*
P	40.5	*1029*
Q	33.5	*851*
R	24.8	*629*



Case 1594 Powershift Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1525 — CASE 2094 POWERSHIFT DIESEL 12 SPEED

POWER TAKE-OFF PERFORMANCE

	Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours (PTO Speed—998 rpm)									
	110.50 *(82.40)*	2100	7.175 *(27.157)*	0.455 *(0.276)*	15.40 *(3.034)*	187 *(86.1)*	65 *(18.5)*	75 *(23.8)*	28.96 *(97.80)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
	97.14 *(72.44)*	2170	6.561 *(24.837)*	0.473 *(0.288)*	14.80 *(2.916)*	184 *(84.2)*	65 *(18.3)*	74 *(23.3)*	....
	0.00 *(0.00)*	2302	2.310 *(8.744)*	....	....	174 *(78.9)*	66 *(18.9)*	75 *(23.9)*	....
	49.97 *(37.26)*	2236	4.341 *(16.434)*	0.608 *(0.370)*	11.51 *(2.267)*	181 *(82.8)*	66 *(18.6)*	76 *(24.2)*	....
	111.42 *(83.09)*	2100	7.230 *(27.368)*	0.454 *(0.276)*	15.41 *(3.036)*	187 *(86.1)*	66 *(18.6)*	75 *(23.6)*	....
	25.33 *(18.89)*	2266	3.373 *(12.767)*	0.932 *(0.567)*	7.51 *(1.480)*	175 *(79.4)*	65 *(18.3)*	74 *(23.1)*	....
	73.99 *(55.17)*	2205	5.366 *(20.311)*	0.508 *(0.309)*	13.79 *(2.716)*	183 *(83.6)*	66 *(18.9)*	75 *(23.9)*	....
Av Av	59.84 *(44.67)*	2213	4.864 *(18.410)*	0.571 *(0.347)*	12.26 *(2.416)*	181 *(82.5)*	66 *(18.6)*	75 *(23.7)*	28.94 *(97.73)*

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th (3-2) Gear											
98.66 *(73.57)*	5851 *(26.02)*	6.32 *(10.18)*	2099	4.45	7.143 *(27.039)*	0.507 *(0.308)*	13.81 *(2.721)*	192 *(88.6)*	70 *(21.1)*	76 *(24.2)*	29.03 *(98.01)*
75% of Pull at Maximum Power—Ten Hours 8th (3-2) Gear											
79.36 *(59.18)*	4443 *(19.76)*	6.70 *(10.78)*	2195	3.26	6.136 *(23.226)*	0.541 *(0.329)*	12.93 *(2.548)*	190 *(87.6)*	70 *(20.9)*	74 *(23.2)*	28.86 *(97.44)*
50% of Pull at Maximum Power—Two Hours 8th (3-2) Gear											
54.15 *(40.38)*	2962 *(13.18)*	6.86 *(11.03)*	2219	2.05	4.807 *(18.197)*	0.621 *(0.378)*	11.27 *(2.219)*	188 *(86.4)*	73 *(22.8)*	82 *(27.5)*	28.87 *(97.47)*
50% of Pull at Reduced Engine Speed—Two Hours 10th (4-1) Gear											
54.20 *(40.41)*	2962 *(13.18)*	6.86 *(11.04)*	1456	2.09	3.850 *(14.574)*	0.497 *(0.302)*	14.08 *(2.773)*	189 *(86.9)*	73 *(22.5)*	83 *(28.1)*	28.83 *(97.34)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
90.78 *(67.69)*	11910 *(52.98)*	2.86 *(4.60)*	2126	14.83	4th (2-1) Gear	189 *(87.2)*	68 *(20.0)*	70 *(21.1)*	29.00 *(97.93)*
98.04 *(73.11)*	8979 *(39.94)*	4.09 *(6.59)*	2101	7.18	5th (2-2) Gear	191 *(88.3)*	70 *(21.1)*	74 *(23.3)*	28.91 *(97.62)*
99.08 *(73.88)*	7975 *(35.47)*	4.66 *(7.50)*	2101	6.08	6th (3-1) Gear	192 *(88.6)*	70 *(21.1)*	74 *(23.3)*	28.91 *(97.62)*
98.50 *(73.45)*	7068 *(31.44)*	5.23 *(8.41)*	2101	5.33	7th (2-3) Gear	192 *(88.9)*	70 *(21.1)*	75 *(23.9)*	28.91 *(97.62)*
100.12 *(74.66)*	5924 *(26.35)*	6.34 *(10.20)*	2100	4.34	8th (3-2) Gear	192 *(88.9)*	70 *(21.1)*	75 *(23.9)*	28.90 *(97.59)*
98.64 *(73.55)*	4619 *(20.54)*	8.01 *(12.89)*	2099	3.25	9th (3-3) Gear	193 *(89.2)*	70 *(21.1)*	75 *(23.9)*	28.90 *(97.59)*

LUGGING ABILITY IN 8th (3-2) GEAR

Crankshaft Speed rpm	2100	1892	1683	1472	1255	1053
Pull—lbs *(kN)*	5924 *(26.35)*	6436 *(28.63)*	6756 *(30.38)*	6827 *(30.60)*	6669 *(29.90)*	6349 *(28.46)*
Increase in Pull %	0	9	14	15	13	7
Power—Hp *(kW)*	100.12 *(74.66)*	97.50 *(72.71)*	90.84 *(67.74)*	80.18 *(59.79)*	67.10 *(50.05)*	53.52 *(39.91)*
Speed—Mph *(km/h)*	6.34 *(10.20)*	5.68 *(9.14)*	5.04 *(8.12)*	4.40 *(7.09)*	3.76 *(6.05)*	3.16 *(5.09)*
Slip %	4.34	4.80	4.95	5.10	4.95	4.80

Department of Agricultural Engineering

Dates of Test: May 30 to June 16, 1984

Manufacturer: J. I. CASE COMPANY, 700 State Street, Racine, Wisconsin 53404

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8408 **Fuel weight** 7.000 lbs/gal *(0.839 kg/l)* **Oil SAE** 30 **API service classification** SF, CD **To motor** 4.354 gal *(16.481 l)* **Drained from motor** 4.085 gal *(15.463 l)* **Transmission and final drive lubricant** Case Powergard PTF transmission fluid **Total time engine was operated** 40.0 hours.

ENGINE: Make Case Diesel **Type** six cylinder vertical **Serial No.** *10356640* **Crankshaft** lengthwise **Rated rpm** 2100 **Bore and stroke** 4.625" × 5.0" *(117.5 mm × 127 mm)* **Compression ratio** 16.0 to 1 **Displacement** 504 cu in *(8259 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** radiator for hydraulic and transmission oil **Fuel filter** two paper cartridges and prestrainer **Muffler** vertical **Cooling medium temperature control** two thermostats.

CHASSIS: Type standard with duals **Serial No.** *9932956* **Tread width** rear 60" *(1524 mm)* to 124" *(3150 mm)* front 60" *(1524 mm)* to 88" *(2235 mm)* **Wheel base** 110" *(2794 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 25.7" *(652 mm)* Vertical distance above roadway 40.7" *(1034 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (3) range operator controlled powershift **Advertised speeds mph** *(km/h)* first 1.9 *(3.1)* second 2.5 *(4.0)* third 3.2 *(5.2)* fourth 3.2 *(5.2)* fifth 4.3 *(6.9)* sixth 4.9 *(7.9)* seventh 5.4 *(8.7)* eighth 6.5 *(10.5)* ninth 8.1 *(13.0)* tenth 9.9 *(15.9)* eleventh 13.2 *(21.2)* twelfth 18.1 *(29.1)* reverse 3.2 *(5.2)*, 5.4 *(8.7)*, 8.1 *(13.0)* **Clutch** wet multiple disc hydraulically power actuated by foot pedal **Brakes** wet multiple disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 161.8" *(4.11 m)* left 161.8" *(4.11 m)* (on concrete surface without brake) right 182.2" *(4.63 m)* left 182.2" *(4.63 m)* **Turning space diameter** (on concrete surface with brake applied) right 338" *(8.59 m)* left 338" *(8.59 m)* (on concrete surface without brake) right 382.2" *(9.71 m)* left 382.2" *(9.71 m)* **Power take-off** 534 rpm at 2100 engine rpm and 998 rpm at 2100 engine rpm.

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Maximum Available Power—Two Hours	77.5
75% of Pull at Maximum Power—Ten Hours	77.0
50% of Pull at Maximum Power—Two Hours	77.5
50% of Pull at Reduced Engine Speed—Two Hours	74.5
Bystander in 12th (4-3) gear	88.0

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Inner Two 18.4-38; 8; 14 *(95)* Outer Two 18.4-38; 6; 14 *(95)*	Inner Two 18.4-38; 8; 14 *(95)* Outer Two 18.4-38; 6; 14 *(95)*
Ballast	—Liquid (each)	None	None
	—Test Equip (each)	78 lb *(35 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 11.00-16; 8; 40 *(275)*	Two 11.00-16; 8; 40 *(275)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	125 lb *(57 kg)*	None
Height of Drawbar		19.5 in *(495 mm)*	19.5 in *(495 mm)*
Static Weight with Operator	—Rear	11230 lb *(5094 kg)*	10920 lb *(4953 kg)*
	—Front	3520 lb *(1597 kg)*	3270 lb *(1483 kg)*
	—Total	14750 lb *(6691 kg)*	14190 lb *(6436 kg)*

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 180°F *(82.2°C)*. Six gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1525, July 19, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Case 2094 Powershift Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1526 — CASE 2294 POWERSHIFT DIESEL 12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—980 rpm)								
131.97 *(98.41)*	2100	8.879 *(33.609)*	0.471 *(0.287)*	14.86 *(2.928)*	190 *(88.0)*	67 *(19.6)*	76 *(24.7)*	28.56 *(96.44)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
115.46 *(86.10)*	2102	8.167 *(30.916)*	0.495 *(0.301)*	14.14 *(2.785)*	186 *(85.6)*	67 *(19.2)*	77 *(25.0)*	....
0.00 *(0.00)*	2307	2.813 *(10.657)*	....	....	173 *(78.1)*	68 *(20.0)*	77 *(25.0)*	....
59.75 *(44.56)*	2230	5.335 *(20.194)*	0.625 *(0.380)*	11.20 *(2.206)*	182 *(83.1)*	68 *(19.7)*	77 *(25.0)*	....
131.56 *(98.10)*	2100	8.857 *(33.526)*	0.471 *(0.287)*	14.85 *(2.926)*	191 *(88.1)*	67 *(19.4)*	77 *(25.0)*	....
30.24 *(22.55)*	2266	4.049 *(15.328)*	0.937 *(0.570)*	7.47 *(1.471)*	176 *(80.0)*	67 *(19.4)*	77 *(25.0)*	....
88.26 *(65.82)*	2204	6.762 *(25.596)*	0.536 *(0.326)*	13.05 *(2.571)*	186 *(85.3)*	68 *(19.7)*	78 *(25.6)*	....
Av 70.88 Av *(52.86)*	2213	5.998 *(22.703)*	0.592 *(0.360)*	11.82 *(2.328)*	182 *(83.3)*	67 *(19.6)*	77 *(25.1)*	28.53 *(96.34)*

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th (3-2) Gear											
115.55 *(86.01)*	6877 *(30.59)*	6.29 *(10.12)*	2090	5.11	8.799 *(33.307)*	0.534 *(0.325)*	13.11 *(2.582)*	193 *(89.2)*	66 *(18.9)*	69 *(20.5)*	28.64 *(96.71)*
75% of Pull at Maximum Power—Ten Hours 8th (3-2) Gear											
92.28 *(68.82)*	5191 *(23.09)*	6.67 *(10.73)*	2100	3.51	7.550 *(28.614)*	0.573 *(0.349)*	12.21 *(2.405)*	191 *(88.4)*	63 *(17.3)*	78 *(25.6)*	28.7. *(97.09)*
50% of Pull at Maximum Power—Two Hours 8th (3-2) Gear											
63.29 *(47.20)*	3461 *(15.40)*	6.86 *(11.04)*	2224	2.34	6.021 *(22.790)*	0.666 *(0.405)*	10.51 *(2.071)*	191 *(88.3)*	75 *(23.9)*	87 *(30.6)*	28.32 *(95.62)*
50% of Pull at Reduced Engine Speed—Two Hours 10th (4-1) Gear											
63.30 *(47.20)*	3461 *(15.40)*	6.86 *(11.04)*	1557	2.34	4.506 *(17.059)*	0.498 *(0.303)*	14.05 *(2.767)*	194 *(90.0)*	72 *(22.2)*	92 *(33.3)*	28.28 *(95.42)*
MAXIMUM POWER IN SELECTED GEARS											
100.47 *(74.92)*	13017 *(57.90)*	2.89 *(4.66)*	2155	14.81		4th (2-1) Gear		190 *(87.8)*	68 *(20.0)*	71 *(21.7)*	28.46 *(96.11)*
113.19 *(84.41)*	10484 *(46.63)*	4.05 *(6.52)*	2100	8.50		5th (2-2) Gear		193 *(89.4)*	69 *(20.6)*	72 *(22.2)*	[illegible] *(96.11)*
114.48 *(85.37)*	9285 *(41.30)*	4.62 *(7.44)*	2100	6.94		6th (3-1) Gear		194 *(89.7)*	70 *(21.1)*	73 *(22.8)*	28.45 *(96.07)*
115.37 *(86.03)*	8342 *(37.11)*	5.19 *(8.35)*	2100	6.15		7th (2-3) Gear		194 *(89.7)*	70 *(21.1)*	74 *(23.3)*	28.44 *(96.04)*
116.38 *(86.78)*	6921 *(30.78)*	6.31 *(10.15)*	2100	4.92		8th (3-2) Gear		195 *(90.5)*	71 *(21.7)*	77 *(25.0)*	28.41 *(95.94)*
115.41 *(86.06)*	5435 *(24.17)*	7.96 *(12.82)*	2090	3.77		9th (3-3) Gear		194 *(90.0)*	71 *(21.7)*	75 *(23.9)*	28.43 *(96.00)*
112.94 *(84.22)*	4315 *(19.19)*	9.82 *(15.80)*	2100	2.98		10th (4-1) Gear		192 *(88.9)*	71 *(21.7)*	76 *(24.4)*	28.42 *(95.97)*

LUGGING ABILITY IN 8th (3-2) GEAR

Crankshaft Speed rpm	2100	1882	1677	1470	1264	1049
Pull—lbs *(kN)*	6921 *(30.78)*	7576 *(33.96)*	8079 *(36.21)*	8401 *(37.43)*	8414 *(37.71)*	8045 *(36.06)*
Increase in Pull %	0	9	17	21	22	16
Power—Hp *(kW)*	116.38 *(86.78)*	114.10 *(85.08)*	107.35 *(80.05)*	97.60 *(72.78)*	83.87 *(62.54)*	66.76 *(49.78)*
Speed—Mph *(km/h)*	6.31 *(10.15)*	5.60 *(9.00)*	4.98 *(8.02)*	4.36 *(7.01)*	3.74 *(6.02)*	3.11 *(5.01)*
Slip %	4.92	5.45	5.75	6.20	6.55	5.90

Department of Agricultural Engineering

Dates of Test: June 1-12, 1984

Manufacturer: J. I. CASE COMPANY, 700 State Street, Racine, Wisconsin 53404

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 40.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8408 **Fuel weight** 7.001 lbs/gal *(0.839 kg/l)* **Oil SAE** 30 **API service classification** SF, CD **To motor** 5.201 gal *(19.687 l)* **Drained from motor** 4.933 gal *(18.674 l)* **Transmission and final drive lubricant** Case Powergard PTF transmission fluid **Total time engine was operated** 39.0 hours.

ENGINE: Make Case Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *10556589* **Crankshaft** lengthwise **Rated rpm** 2100 **Bore and stroke** 4.625" × 5.0" *(117.5 mm × 127 mm)* **Compression ratio** 15.8 to 1 **Displacement** 504 cu in *(8259 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** two full flow cartridges **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper cartridges and prestrainer **Muffler** vertical **Cooling medium temperature control** two thermostats.

CHASSIS: Type standard with duals **Serial No.** *9932940* **Tread width** rear 60" *(1524 mm)* to 124" *(3150 mm)* front 60" *(1524 mm)* to 88" *(2235 mm)* **Wheel base** 110" *(2794 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 25.8" *(655 mm)* Vertical distance above roadway 40.6" *(1031 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (3) range operator controlled powershift **Advertised speeds mph *(km/h)*** first 1.9 *(3.1)* second 2.5 *(4.0)* third 3.2 *(5.2)* fourth 3.2 *(5.2)* fifth 4.3 *(6.9)* sixth 4.9 *(7.9)* seventh 5.4 *(8.7)* eighth 6.5 *(10.5)* ninth 8.1 *(13.0)* tenth 9.9 *(15.9)* eleventh 13.2 *(21.2)* twelfth 18.1 *(29.1)* reverse 3.2 *(5.2)*, 5.4 *(8.7)*, 8.1 *(13.0)* **Clutch** wet multiple disc hydraulically power actuated by foot pedal **Brakes** wet multiple disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 162" *(4.12 m)* left 162" *(4.12 m)* (on concrete surface without brake) right 182" *(4.62 m)* left 182" *(4.62 m)* **Turning space diameter** (on concrete surface with brake applied) right 338" *(8.59 m)* left 338" *(8.59 m)* (on concrete surface without brake) right 382" *(9.70 m)* left 382" *(9.70 m)* **Power take-off** 534 rpm at 2100 engine rpm and 980 rpm at 2100 engine rpm.

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Maximum Available Power—Two Hours	76.0
75% of Pull at Maximum Power—Ten Hours	76.5
50% of Pull at Maximum Power—Two Hours	76.5
50% of Pull at Reduced Engine Speed—Two Hours	75.5
Bystander in 12th (3-4) gear	84.5

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 18.4-38; 6; 14 *(97)*	Four 18.4-38; 6; 14 *(97)*
Ballast	—Liquid (each inner)	522 lb *(237 kg)*	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 11.00-16; 8; 40 *(275)*	Two 11.00-16; 8; 40 *(275)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	116 lb *(53 kg)*	None
Height of Drawbar		19.5 in *(495 mm)*	19.5 in *(495 mm)*
Static Weight with Operator—Rear		12100 lb *(5489 kg)*	11055 lb *(5014 kg)*
—Front		3570 lb *(1619 kg)*	3335 lb *(1513 kg)*
—Total		15670 lb *(7108 kg)*	14390 lb *(6527 kg)*

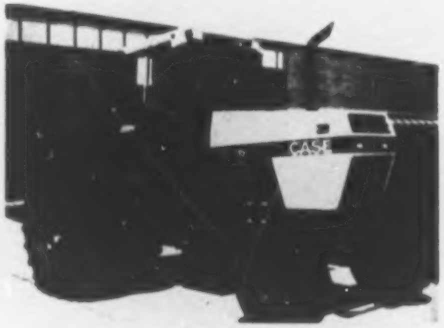
REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 192°F *(89.0°C)*. Seven gears were chosen between 15% slip and 10 mph *(16.1 km/h)*. During drawbar tests, the engine oil pressure warning light and beeper were activated intermittently.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1526**, July 19, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Case 2294 Powershift Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1527—CASE 2394 POWERSHIFT DIESEL 24 SPEED ALSO 12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1002 rpm)								
162.15 (120.91)	2100	10.496 (39.731)	0.453 (0.275)	15.46 (3.046)	188 (86.4)	69 (20.5)	76 (24.2)	28.90 (97.59)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
141.26 (105.34)	2152	9.424 (35.674)	0.467 (0.284)	14.99 (2.953)	184 (84.2)	70 (21.1)	77 (24.7)	....
0.00 (0.00)	2327	2.833 (10.723)	....	....	171 (77.2)	70 (21.1)	76 (24.4)	....
73.68 (54.94)	2245	6.141 (23.247)	0.583 (0.355)	12.00 (2.363)	177 (80.6)	71 (21.4)	77 (24.7)	....
159.46 (118.91)	2100	10.401 (39.371)	0.457 (0.278)	15.33 (3.020)	188 (86.4)	71 (21.7)	79 (25.8)	....
37.44 (27.92)	2283	4.363 (16.515)	0.816 (0.496)	8.58 (1.691)	174 (78.9)	71 (21.7)	79 (26.1)	....
108.02 (80.55)	2194	7.757 (29.363)	0.503 (0.306)	13.92 (2.743)	182 (83.3)	72 (22.2)	80 (26.7)	....
Av 86.64 Av (64.61)	2217	6.820 (25.816)	0.551 (0.335)	12.70 (2.503)	179 (81.7)	71 (21.5)	78 (25.4)	28.88 (97.52)

DRAWBAR PERFORMANCE WITH BIAS PLY TIRES

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 16th (3-4) Gear											
137.78 (102.74)	8548 (38.02)	6.04 (9.73)	2100	4.81	10.264 (38.855)	0.521 (0.317)	13.42 (2.644)	194 (90.0)	75 (23.6)	84 (28.9)	28.85 (97.34)
75% of Pull at Maximum Power—Ten Hours 16th (3-4) Gear											
110.93 (82.72)	6575 (29.24)	6.33 (10.18)	2170	3.51	8.724 (33.025)	0.551 (0.335)	12.71 (2.505)	186 (85.8)	71 (21.6)	74 (23.1)	28.98 (97.85)
50% of Pull at Maximum Power—Two Hours 16th (3-4) Gear											
76.65 (57.15)	4382 (19.49)	6.56 (10.55)	2222	2.34	6.943 (26.282)	0.634 (0.386)	11.04 (2.174)	186 (85.6)	77 (24.7)	84 (28.6)	29.00 (97.93)
50% of Pull at Reduced Engine Speed—Two Hours 18th (3-6) Gear											
76.66 (57.16)	4382 (19.49)	6.56 (10.56)	1777	2.34	5.857 (22.172)	0.535 (0.325)	13.09 (2.578)	187 (86.1)	77 (25.0)	89 (31.4)	28.98 (97.84)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med °F (°C)	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
124.29 (92.68)	15497 (68.93)	3.01 (4.84)	2112	14.77	8th (2-2) Gear	190 (87.8)	72 (22.2)	77 (25.0)	28.82 (97.32)
135.66 (101.16)	13795 (61.36)	3.69 (5.93)	2100	9.16	9th (2-3) Gear	189 (87.2)	71 (21.7)	74 (23.3)	29.03 (98.03)
134.95 (100.63)	13460 (59.87)	3.76 (6.05)	2100	9.01	10th (3-1) Gear	189 (87.2)	71 (21.7)	75 (23.9)	29.03 (98.03)
138.25 (103.09)	11955 (53.18)	4.34 (6.98)	2100	7.39	11th (2-4) Gear	192 (88.6)	76 (24.4)	82 (27.8)	29.00 (97.93)
138.53 (103.30)	11756 (52.29)	4.42 (7.11)	2100	7.17	12th (3-2) Gear	193 (89.4)	76 (24.4)	82 (27.8)	29.00 (97.93)
139.25 (103.83)	10998 (48.92)	4.75 (7.64)	2101	6.41	13th (2-5) Gear	193 (89.2)	75 (23.9)	81 (27.2)	29.01 (97.96)
140.21 (104.56)	10135 (45.07)	5.19 (8.35)	2101	5.71	14th (3-3) Gear	193 (89.4)	75 (23.9)	81 (27.2)	29.01 (97.96)
142.07 (105.95)	9632 (42.84)	5.53 (8.90)	2101	5.40	15th (2-6) Gear	193 (89.4)	73 (22.8)	77 (25.0)	29.02 (98.00)
141.04 (105.18)	8764 (38.98)	6.04 (9.71)	2099	4.77	16th (3-4) Gear	193 (89.2)	73 (22.8)	77 (25.0)	29.01 (97.96)
140.53 (104.79)	8010 (35.63)	6.58 (10.59)	2101	4.30	17th (3-5) Gear	193 (89.2)	74 (23.3)	78 (25.6)	29.01 (97.96)
139.69 (104.17)	6855 (30.49)	7.64 (12.30)	2100	3.73	18th (3-6) Gear	192 (88.9)	74 (23.3)	79 (26.1)	29.01 (97.96)
137.37 (102.44)	5424 (24.13)	9.50 (15.29)	2099	2.85	19th (4-1) Gear	190 (87.8)	75 (23.9)	80 (26.7)	29.01 (97.96)

Department of Agricultural Engineering

Dates of Test: June 7-23, 1984

Manufacturer: J. I. CASE COMPANY, 700 State Street, Racine, Wisconsin 53404

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8408 **Fuel weight** 7.000 lbs/gal *(0.839 kg/l)* **Oil SAE 30 API service classification** SF, CD **To motor** 6.843 gal *(25.902 l)* **Drained from motor** 6.348 gal *(24.030 l)* **Transmission and final drive lubricant** Case Powergard PTF transmission fluid **Total time engine was operated** 54.0 hours.

ENGINE: **Make** Case Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *10357180* **Crankshaft** lengthwise **Rated rpm** 2100 **Bore and stroke** 4.625" x 5.0" *(117.5 mm x 127 mm)* **Compression ratio** 15.8 to 1 **Displacement** 504 cu in *(8259 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** two full flow cartridges **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper cartridges and prestrainer **Muffler** vertical **Cooling medium temperature control** two thermostats.

CHASSIS: **Type** standard with duals **Serial No.** *9933245* **Tread width** rear 64" *(1626 mm)* to 134" *(3404 mm)* front 61" *(1549 mm)* to 89" *(2261 mm)* **Wheel base** 118" *(2997 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 27.5" *(700 mm)* Vertical distance above roadway 40.7" *(1034 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (6) range operator controlled powershift **Advertised speeds mph** *(km/h)* first 1.7 *(2.8)* second 2.0 *(3.2)* third 2.3 *(3.8)* fourth 2.7 *(4.3)* fifth 2.9 *(4.7)* sixth 3.0 *(4.8)* seventh 3.4 *(5.4)* eighth 3.5 *(5.6)* ninth 4.0 *(6.5)* tenth 4.1 *(6.6)* eleventh 4.6 *(7.4)* twelfth 4.7 *(7.6)* thirteenth 5.0 *(8.1)* fourteenth 5.5 *(8.8)* fifteenth 5.8 *(9.3)* sixteenth 6.3 *(10.1)* seventeenth 6.8 *(11.0)* eighteenth 7.9 *(12.0)* nineteenth 9.7 *(15.6)* twentieth 11.2 *(18.0)* twenty-first 12.9 *(20.8)* twenty-second 14.9 *(23.9)* twenty-third 16.1 *(25.9)* twenty-fourth 20.1 *(32.4)* reverse 2.9 *(4.7)*, 5.0 *(8.1)*, 6.8 *(11.0)* **Clutch** wet multiple disc hydraulically power actuated by foot pedal **Brakes** wet multiple disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 163.8" *(4.16 m)* left 163.8" *(4.16 m)* (on concrete surface without brake) right 184.5" *(4.69 m)* left 184.5" *(4.69 m)* **Turning space diameter** (on concrete surface with brake applied) right 342.0" *(8.69 m)* left 342.0" *(8.69 m)* (on concrete surface without brake) right 388.8" *(9.88 m)* left 388.8" *(9.88 m)* **Power take-off** 1002 rpm at 2100 engine rpm.

DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 16th (3-4) Gear											
139.80 (104.25)	8138 (36.20)	6.44 (10.37)	2100	2.26	10.279 (38.909)	0.515 (0.313)	13.60 (2.679)	196 (90.8)	74 (23.3)	89 (31.4)	28.80 (97.25)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med °F (°C)	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
121.97 (90.95)	16799 (74.72)	2.72 (4.38)	2119	14.54	6th (2-1) Gear	185 (85.0)	71 (21.7)	75 (23.9)	28.80 (97.25)
137.77 (102.73)	15907 (70.76)	3.25 (5.23)	2100	7.82	7th (1-6) Gear	188 (86.4)	71 (21.7)	76 (24.4)	28.81 (97.29)
139.93 (104.35)	15482 (68.87)	3.39 (5.45)	2100	7.04	8th (2-2) Gear	188 (86.4)	71 (21.7)	77 (25.0)	28.82 (97.33)
142.25 (106.08)	13267 (59.01)	4.02 (6.47)	2101	4.63	9th (2-3) Gear	188 (86.4)	71 (21.7)	78 (25.6)	28.82 (97.32)
142.48 (106.25)	13058 (58.08)	4.09 (6.58)	2099	4.54	10th (3-1) Gear	190 (87.3)	71 (21.7)	79 (26.1)	28.82 (97.32)
143.48 (106.99)	11489 (51.11)	4.68 (7.34)	2101	3.63	11th (2-4) Gear	192 (88.9)	71 (21.7)	80 (26.7)	28.82 (97.32)
142.82 (106.50)	11222 (49.92)	4.77 (7.68)	2100	3.54	12th (3-2) Gear	192 (88.6)	71 (21.7)	80 (26.7)	28.82 (97.32)
145.01 (108.13)	10668 (47.45)	5.10 (8.20)	2099	3.29	13th (2-5) Gear	191 (88.3)	71 (21.7)	81 (27.2)	28.82 (97.32)
143.60 (107.08)	9694 (43.12)	5.55 (8.94)	2100	2.86	14th (3-3) Gear	194 (89.7)	72 (22.2)	82 (27.8)	28.81 (97.29)
143.47 (106.98)	9088 (40.42)	5.92 (9.53)	2099	2.69	15th (2-6) Gear	193 (89.4)	72 (22.2)	83 (28.3)	28.81 (97.29)
143.44 (106.97)	8357 (37.17)	6.44 (10.36)	2099	2.34	16th (3-4) Gear	193 (89.4)	72 (22.2)	83 (28.3)	28.81 (97.29)
142.25 (106.07)	7624 (33.91)	7.00 (11.26)	2100	2.08	17th (3-5) Gear	193 (89.4)	72 (22.2)	84 (28.9)	28.81 (97.29)
139.95 (104.36)	6482 (28.83)	8.10 (13.03)	2099	1.82	18th (3-6) Gear	194 (89.7)	72 (22.2)	84 (28.9)	28.81 (97.29)

TIRES, BALLAST AND WEIGHT		Bias Ply Tires With Ballast	Bias Ply Tires Without Ballast	Radial Ply Tires With Ballast	Radial Ply Tires Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Four 20.8-38; 8; 14 *(95)*	Four 20.8-38; 8; 14 *(95)*	Four 20.8R38; 8; 14 *(95)*	Four 20.8R38; 8; 14 *(95)*
Ballast	—Liquid (each inner)	1068 lb *(484 kg)*	None	980 lb *(445 kg)*	None
	—Cast Iron (each)	None	None	None	None
Front Tires	—No., size, ply & psi (kPa)	Two 14L-16.1; 10; 40 *(275)*	Two 14L-16.1; 10; 40 *(275)*	Two 14L-16.1; 10; 40 *(275)*	Two 14L-16.1; 10; 40 *(275)*
Ballast	—Liquid (each)	None	None	None	None
	—Cast Iron (each)	110 lb *(50 kg)*	None	120 lb *(54 kg)*	None
Height of Drawbar		22.5 in *(570 mm)*	22.5 in *(570 mm)*	21.5 in *(545 mm)*	21.5 in *(545 mm)*
Static Weight with Operator	—Rear	14625 lb *(6634 kg)*	12490 lb *(5665 kg)*	14610 lb *(6627 kg)*	12650 lb *(5738 kg)*
	—Front	3970 lb *(1801 kg)*	3750 lb *(1701 kg)*	3990 lb *(1810 kg)*	3750 lb *(1701 kg)*
	—Total	18595 lb *(8435 kg)*	16240 lb *(7366 kg)*	18600 lb *(8437 kg)*	16400 lb *(7439 kg)*

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 179°F *(81.7°C)*. Twelve gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 1527, July 19, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Case 2394 Powershift Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

LUGGING ABILITY IN 16th (3-4) GEAR

Crankshaft Speed rpm	2099	1892	1677	1450	1262	1054
Pull—lbs *(kN)*	8764 *(38.98)*	9947 *(44.38)*	10572 *(46.49)*	10618 *(47.39)*	10304 *(46.18)*	9514 *(41.75)*
Increase in Pull %	0	13	18	21	18	6
Power—Hp *(kW)*	141.04 *(105.18)*	143.08 *(106.69)*	131.76 *(98.25)*	117.11 *(87.33)*	98.46 *(73.42)*	74.82 *(55.79)*
Speed—Mph *(km/h)*	6.04 *(9.71)*	5.39 *(8.68)*	4.76 *(7.67)*	4.14 *(6.66)*	3.58 *(5.77)*	3.01 *(4.85)*
Slip %	4.77	3.71	5.87	6.18	6.02	5.56

TRACTOR SOUND LEVEL WITH CAB	Radial Ply dB(A)	Bias Ply dB(A)
Maximum Available Power—Two Hours	76.0	76.0
75% of Pull at Maximum Power—Ten Hours		75.5
50% of Pull at Maximum Power—Two Hours		76.0
50% of Pull at Reduced Engine Speed—Two Hours		74.0
Bystander in 23rd (4-5) gear		88.0

NEBRASKA TRACTOR TEST 1529—CASE 2594 POWERSHIFT DIESEL
24 SPEED ALSO 12 SPEED

POWER TAKE-OFF PERFORMANCE

	Power Hp *(kW)*	Crank-shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
	MAXIMUM POWER AND FUEL CONSUMPTION								
	Rated Engine Speed—Two Hours (PTO Speed—1002 rpm)								
	182.07 *(135.77)*	2100	11.952 *(45.244)*	0.460 *(0.280)*	15.23 *(3.000)*	195 *(90.7)*	63 *(17.3)*	75 *(23.6)*	28.67 *(96.83)*
	VARYING POWER AND FUEL CONSUMPTION—Two Hours								
	160.09 *(119.38)*	2171	10.704 *(40.519)*	0.468 *(0.285)*	14.96 *(2.946)*	189 *(86.9)*	63 *(17.2)*	75 *(23.6)*	....
	0.00 *(0.00)*	2300	3.055 *(11.565)*	....	....	173 *(78.1)*	65 *(18.9)*	75 *(23.6)*	....
	82.92 *(61.83)*	2250	6.642 *(25.143)*	0.561 *(0.341)*	12.48 *(2.459)*	179 *(81.4)*	62 *(16.7)*	74 *(23.3)*	....
	183.49 *(136.83)*	2100	11.994 *(45.401)*	0.458 *(0.278)*	15.30 *(3.014)*	193 *(89.4)*	62 *(16.9)*	76 *(24.2)*	....
	42.04 *(31.35)*	2281	4.825 *(18.264)*	0.804 *(0.489)*	8.71 *(1.716)*	174 *(78.9)*	63 *(17.2)*	74 *(23.3)*	....
	122.41 *(91.28)*	2213	8.656 *(32.765)*	0.495 *(0.301)*	14.14 *(2.786)*	183 *(83.6)*	63 *(17.2)*	75 *(23.6)*	....
Av *Av*	98.49 *(73.44)*	2223	7.648 *(28.948)*	0.544 *(0.331)*	12.88 *(2.536)*	182 *(83.1)*	63 *(17.4)*	75 *(23.6)*	28.36 *(96.04)*

DRAWBAR PERFORMANCE WITH BIAS PLY TIRES

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 16th (3-4) Gear											
159.64 *(119.04)*	9346 *(41.57)*	6.41 *(10.31)*	2099	5.83	11.961 *(45.280)*	0.524 *(0.319)*	13.35 *(2.630)*	199 *(92.8)*	68 *(20.0)*	75 *(23.6)*	28.50 *(96.51)*
75% of Pull at Maximum Power—Ten Hours 16th (3-4) Gear											
128.78 *(96.03)*	7115 *(31.65)*	6.79 *(10.92)*	2186	4.16	9.950 *(37.665)*	0.541 *(0.329)*	12.94 *(2.550)*	193 *(89.4)*	72 *(22.1)*	81 *(26.9)*	28.52 *(96.29)*
50% of Pull at Maximum Power—Two Hours 16th (3-4) Gear											
89.05 *(66.40)*	4744 *(21.10)*	7.04 *(11.33)*	2235	2.70	7.656 *(28.981)*	0.602 *(0.366)*	11.63 *(2.291)*	187 *(85.8)*	69 *(20.6)*	78 *(25.6)*	28.54 *(96.36)*
50% of Pull at Reduced Engine Speed—Two Hours 18th (3-6) Gear											
89.03 *(66.39)*	4743 *(21.10)*	7.04 *(11.33)*	1708	2.66	6.585 *(24.926)*	0.518 *(0.315)*	13.52 *(2.664)*	188 *(86.4)*	69 *(20.6)*	82 *(27.5)*	28.55 *(96.39)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Gear	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
145.87 *(108.78)*	16874 *(75.06)*	3.24 *(5.22)*	2131	14.97	8th (2-2) Gear	191 *(88.3)*	66 *(18.9)*	72 *(22.2)*	28.49 *(96.21)*
152.62 *(113.81)*	14856 *(66.08)*	3.85 *(6.20)*	2100	11.33	9th (2-3) Gear	196 *(91.1)*	66 *(18.9)*	71 *(21.7)*	28.64 *(96.71)*
153.85 *(114.73)*	14694 *(65.36)*	3.93 *(6.32)*	2099	11.26	10th (3-1) Gear	196 *(91.1)*	66 *(18.9)*	71 *(21.7)*	28.63 *(96.68)*
159.36 *(118.84)*	13083 *(58.20)*	4.57 *(7.35)*	2099	8.90	11th (2-4) Gear	194 *(90.0)*	66 *(18.9)*	71 *(21.7)*	28.63 *(96.68)*
159.75 *(119.12)*	12853 *(57.17)*	4.66 *(7.50)*	2100	8.56	12th (3-2) Gear	195 *(90.6)*	65 *(18.3)*	71 *(21.7)*	28.62 *(96.65)*
158.66 *(118.32)*	11862 *(52.76)*	5.02 *(8.07)*	2101	7.74	13th (2-5) Gear	195 *(90.5)*	65 *(18.3)*	71 *(21.7)*	28.62 *(96.65)*
158.84 *(118.44)*	10865 *(48.33)*	5.48 *(8.82)*	2099	6.91	14th (3-3) Gear	195 *(90.6)*	65 *(18.3)*	71 *(21.7)*	28.61 *(96.61)*
160.19 *(119.46)*	10258 *(45.63)*	5.86 *(9.43)*	2099	6.53	15th (2-6) Gear	194 *(90.0)*	65 *(18.3)*	71 *(21.7)*	28.61 *(96.61)*
161.96 *(120.77)*	9487 *(42.20)*	6.40 *(10.30)*	2100	5.91	16th (3-4) Gear	197 *(91.6)*	67 *(19.4)*	73 *(22.8)*	28.60 *(96.58)*
159.86 *(119.21)*	8596 *(38.24)*	6.97 *(11.22)*	2099	5.29	17th (3-5) Gear	195 *(90.6)*	65 *(18.3)*	70 *(21.1)*	28.60 *(96.58)*
159.89 *(119.23)*	7390 *(32.87)*	8.11 *(13.06)*	2100	4.57	18th (3-6) Gear	195 *(90.6)*	66 *(18.9)*	71 *(21.7)*	28.60 *(96.58)*

Department of Agricultural Engineering

Dates of Test: May 31 to June 20, 1984

Manufacturer: J. I. CASE COMPANY, 700 State Street, Racine, Wisconsin 53404

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8406 **Fuel weight** 7.001 **lbs/gal** *(0.839 kg/l)* **Oil SAE 30 API service classification** SF, CD **To motor** 7.318 gal *(27.701 l)* **Drained from motor** 6.670 gal *(25.249 l)* **Transmission and final drive lubricant** Case Powergard PTF transmission fluid **Total time engine was operated** 48.0 hours.

ENGINE: Make Case Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *10336086* **Crankshaft** lengthwise **Rated rpm** 2100 **Bore and stroke** 4.625" x 5.00" *(117.5 mm x 127 mm)* **Compression ratio** 15.8 to 1 **Displacement** 504 cu in *(8259 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** two full flow cartridges **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper cartridges and prestrainer **Muffler** vertical **Cooling medium temperature control** two thermostats.

CHASSIS: Type standard with duals **Serial No.** *99532894* **Tread width** rear 64" *(1626 mm)* to 134" *(3404 mm)* front 61" *(1549 mm)* to 89" *(2261 mm)* **Wheel base** 118" *(2997 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 27.6" *(700 mm)* Vertical distance above roadway 39.8" *(1011 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (6) range operator controlled powershift **Advertised speeds mph (km/h)** first 1.9 *(3.0)* second 2.1 *(3.4)* third 2.5 *(4.0)* fourth 2.9 *(4.6)* fifth 3.1 *(5.0)* sixth 3.2 *(5.2)* seventh 3.6 *(5.8)* eighth 3.7 *(6.0)* ninth 4.3 *(6.9)* tenth 4.4 *(7.0)* eleventh 4.9 *(7.9)* twelfth 5.0 *(8.1)* thirteenth 5.4 *(8.6)* fourteenth 5.8 *(9.4)* fifteenth 6.2 *(9.9)* sixteenth 6.7 *(10.8)* seventeenth 7.3 *(11.7)* eighteenth 8.4 *(13.5)* nineteenth 10.4 *(16.7)* twentieth 11.9 *(19.1)* twenty-first 13.8 *(22.2)* twenty-second 15.9 *(25.5)* twenty-third 17.2 *(27.7)* twenty-fourth 20.8 *(33.5)* reverse 3.1 *(5.0)*, 5.4 *(8.6)*, 7.3 *(11.7)* **Clutch** wet multiple disc hydraulically power actuated by foot pedal **Brakes** wet multiple disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 163.8" *(4.16 m)* left 163.8" *(4.16 m)* (on concrete surface without brake) right 184.5" *(4.69 m)* left 184.5" *(4.69 m)* **Turning space diameter** (on concrete surface with brake applied) right 342" *(8.69 m)* left 342" *(8.69 m)* (on concrete surface without brake) right 388.8" *(9.88 m)* left 388.8" *(9.88 m)* **Power take-off** 1002 rpm at 2100 engine rpm.

DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 16th (3-4) Gear											
161.92 *(120.74)*	8845 *(39.34)*	6.86 *(11.05)*	2101	2.58	11.771 *(44.560)*	0.509 *(0.310)*	13.76 *(2.710)*	201 *(93.9)*	69 *(20.6)*	82 *(27.8)*	28.99 *(97.88)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Gear	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
141.36 *(105.40)*	17750 *(78.96)*	2.99 *(4.81)*	2148	15.65	6th (2-1) Gear	190 *(86.7)*	65 *(18.3)*	70 *(21.1)*	28.92 *(97.66)*
157.04 *(117.10)*	17187 *(76.45)*	3.43 *(5.51)*	2102	9.96	7th (1-6) Gear	193 *(89.4)*	66 *(18.9)*	72 *(22.2)*	28.95 *(97.69)*
160.99 *(120.05)*	16918 *(75.26)*	3.57 *(5.74)*	2100	8.40	8th (2-2) Gear	192 *(88.9)*	65 *(18.3)*	73 *(22.8)*	28.93 *(97.69)*
162.90 *(121.52)*	14256 *(63.41)*	4.28 *(6.88)*	2100	4.97	9th (2-3) Gear	195 *(90.5)*	67 *(19.4)*	74 *(23.3)*	28.94 *(97.73)*
163.17 *(121.68)*	14004 *(62.30)*	4.36 *(7.01)*	2099	4.80	10th (3-1) Gear	194 *(90.0)*	67 *(19.4)*	74 *(23.3)*	28.95 *(97.76)*
167.36 *(124.80)*	12590 *(56.00)*	4.98 *(8.02)*	2100	4.15	11th (2-4) Gear	195 *(90.6)*	67 *(19.4)*	75 *(23.9)*	28.95 *(97.76)*
167.28 *(124.74)*	12342 *(54.90)*	5.08 *(8.17)*	2101	3.90	12th (3-2) Gear	197 *(91.4)*	67 *(19.4)*	75 *(23.9)*	28.96 *(97.79)*
164.75 *(122.86)*	11378 *(50.61)*	5.43 *(8.74)*	2099	3.56	13th (2-5) Gear	197 *(91.7)*	67 *(19.4)*	76 *(24.4)*	28.96 *(97.79)*
168.21 *(125.28)*	10472 *(46.58)*	5.92 *(9.52)*	2100	3.13	14th (3-3) Gear	197 *(91.7)*	67 *(19.4)*	76 *(24.4)*	28.97 *(97.83)*
166.41 *(124.09)*	9894 *(44.01)*	6.31 *(10.15)*	2101	2.80	15th (2-6) Gear	198 *(91.9)*	68 *(20.0)*	78 *(25.6)*	28.97 *(97.83)*
166.82 *(124.39)*	9119 *(40.56)*	6.86 *(11.04)*	2100	2.70	16th (3-4) Gear	198 *(92.2)*	68 *(20.0)*	78 *(25.6)*	28.99 *(97.89)*
163.52 *(121.94)*	8238 *(36.64)*	7.45 *(11.99)*	2099	2.45	17th (3-5) Gear	198 *(92.2)*	69 *(20.6)*	79 *(26.1)*	28.98 *(97.86)*
165.04 *(123.07)*	7113 *(31.64)*	8.63 *(13.89)*	2100	2.01	18th (3-6) Gear	198 *(92.2)*	70 *(21.1)*	80 *(26.7)*	28.97 *(97.83)*

TIRES, BALLAST AND WEIGHT		Bias Ply Tires **With Ballast**	Bias Ply Tires **Without Ballast**	Radial Ply Tires **With Ballast**	Radial Ply Tires **Without Ballast**
Rear Tires	—No., size, ply & psi *(kPa)*	Four 20.8-38; 8; 14 *(95)*	Four 20.8-38; 8; 14 *(95)*	Four 20.8R38; 8; 14 *(95)*	Four 20.8R38; 8; 14 *(95)*
Ballast	—Liquid (each inner)	1297 lb *(589 kg)*	None	1380 lb *(626 kg)*	None
	—Cast Iron (each inner)	200 lb *(91 kg)*	None	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 14L-16.1; 10; 40 *(275)*	Two 14L-16.1; 10; 40 *(275)*	Two 14L-16.1; 10; 40 *(275)*	Two 14L-16.1; 10; 40 *(275)*
Ballast	—Liquid (each)	None	None	None	None
	—Cast Iron (each)	286 lb *(130 kg)*	None	295 lb *(133 kg)*	None
Height of Drawbar		22.5 in *(570 mm)*	22.5 in *(570 mm)*	22.5 in *(570 mm)*	22.5 in *(570 mm)*
Static Weight with Operator	—Rear	15465 lb *(7015 kg)*	12470 lb *(5656 kg)*	15390 lb *(6981 kg)*	12630 lb *(5729 kg)*
	—Front	4325 lb *(1962 kg)*	3750 lb *(1701 kg)*	4335 lb *(1966 kg)*	3750 lb *(1701 kg)*
	—Total	19790 lb *(8977 kg)*	16220 lb *(7357 kg)*	19725 lb *(8947 kg)*	16380 lb *(7430 kg)*

REPAIRS and ADJUSTMENTS: Before the sound tests, it was necessary to replace the hydraulic brake hose lines and install the missing clutch cable support bracket.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 186°F *(85.6°C)*. Eleven gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1529, July 20, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Case 2594 Powershift Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

LUGGING ABILITY IN 16th (3-4) GEAR

Crankshaft Speed rpm	2100	1892	1679	1476	1263	1051
Pull—lbs *(kN)*	9487 *(42.20)*	10388 *(46.37)*	11049 *(49.32)*	11127 *(49.87)*	10720 *(48.05)*	9392 *(42.10)*
Increase in Pull %	0	10	16	17	13	−1
Power—Hp *(kW)*	161.96 *(120.77)*	158.90 *(118.49)*	149.02 *(111.13)*	131.70 *(98.21)*	108.94 *(81.24)*	80.07 *(59.70)*
Speed—Mph *(km/h)*	6.40 *(10.30)*	5.74 *(9.23)*	5.06 *(8.14)*	4.44 *(7.14)*	3.81 *(6.13)*	3.20 *(5.14)*
Slip %	5.91	6.61	6.91	7.21	6.91	6.14

TRACTOR SOUND LEVEL WITH CAB	Radial Ply dB(A)	Bias Ply dB(A)
Maximum Available Power—Two Hours	76.5	78.0
75% of Pull at Maximum Power—Ten Hours		76.5
50% of Pull at Maximum Power—Two Hours		76.5
50% of Pull at Reduced Engine Speed—Two Hours		74.0
Bystander in 23rd (4-5) gear		87.5

NEBRASKA TRACTOR TEST 1528 — CASE 3294 POWERSHIFT DIESEL 12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—998 rpm)								
162.63 (121.27)	2100	10.614 (40.174)	0.457 (0.278)	15.32 (3.019)	186 (85.7)	69 (20.7)	75 (23.8)	29.02 (98.27)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
141.76 (105.71)	2154	9.537 (36.100)	0.471 (0.286)	14.86 (2.928)	182 (83.1)	70 (20.8)	76 (24.4)	......
0.00 (0.00)	2317	3.019 (11.427)	.....	.....	173 (78.1)	70 (20.8)	75 (23.9)	......
73.86 (55.08)	2245	6.119 (23.163)	0.580 (0.353)	12.07 (2.378)	179 (81.4)	69 (20.6)	73 (22.8)	......
162.99 (121.54)	2100	10.652 (40.320)	0.437 (0.266)	15.30 (3.014)	187 (85.8)	70 (20.8)	75 (23.9)	......
37.48 (27.95)	2280	4.554 (17.238)	0.850 (0.517)	8.23 (1.621)	175 (79.4)	70 (20.8)	76 (24.2)	......
108.76 (81.10)	2304	7.830 (29.640)	0.504 (0.306)	13.89 (2.736)	181 (82.8)	70 (21.1)	76 (24.4)	......
Av 87.48 Av (65.23)	2216	6.952 (26.315)	0.556 (0.338)	12.58 (2.479)	179 (81.8)	70 (20.8)	75 (23.9)	28.92 (97.94)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th (2-3) Gear											
140.79 (104.99)	9185 (40.85)	5.75 (9.25)	2110	3.82	10.392 (39.337)	0.516 (0.314)	13.55 (2.669)	192 (88.9)	71 (21.7)	75 (23.9)	28.90 (97.59)
75% of Pull at Maximum Power—Ten Hours 7th (2-3) Gear											
113.38 (84.55)	7029 (31.27)	6.05 (9.73)	2182	2.60	8.882 (33.623)	0.548 (0.333)	12.76 (2.515)	189 (87.2)	73 (22.6)	77 (25.1)	28.95 (97.75)
50% of Pull at Maximum Power—Two Hours 7th (2-3) Gear											
77.79 (58.01)	4687 (20.85)	6.22 (10.02)	2225	1.57	6.990 (26.459)	0.629 (0.382)	11.13 (2.192)	188 (86.7)	70 (20.8)	85 (29.2)	28.99 (97.88)
50% of Pull at Reduced Engine Speed—Two Hours 9th (3-3) Gear											
77.93 (58.11)	4687 (20.85)	6.23 (10.03)	1484	1.02	5.496 (20.807)	0.495 (0.300)	14.18 (2.793)	189 (86.9)	72 (22.2)	87 (30.5)	28.97 (97.83)
MAXIMUM POWER IN SELECTED GEARS											
106.94 (79.74)	16242 (72.25)	2.47 (3.97)	2166	14.63		2nd (1-2) Gear		195 (90.6)	69 (20.6)	72 (22.2)	28.80 (97.52)
127.83 (95.32)	15890 (70.68)	3.02 (4.86)	2101	14.05		3rd (1-3) Gear		189 (87.2)	70 (21.1)	73 (22.8)	28.90 (97.59)
129.22 (96.36)	15585 (69.32)	3.11 (5.00)	2101	13.21		4th (2-1) Gear		189 (87.2)	65 (18.3)	75 (23.9)	29.00 (97.93)
141.22 (105.31)	11717 (52.12)	4.52 (7.27)	2100	5.51		5th (2-2) Gear		191 (88.1)	65 (18.3)	76 (24.4)	29.00 (97.93)
141.84 (105.77)	10349 (46.03)	5.14 (8.27)	2100	4.55		6th (3-1) Gear		192 (88.4)	65 (18.3)	76 (24.4)	29.00 (97.93)
143.68 (107.14)	9372 (41.69)	5.75 (9.25)	2100	3.86		7th (2-3) Gear		192 (88.9)	66 (18.9)	77 (25.0)	29.00 (97.93)
143.48 (106.99)	7727 (34.37)	6.96 (11.21)	2100	3.01		8th (3-2) Gear		192 (88.9)	66 (18.9)	78 (25.6)	29.00 (97.93)
141.08 (105.20)	6024 (26.80)	8.78 (14.13)	2102	2.32		9th (3-3) Gear		192 (88.9)	67 (19.4)	79 (26.1)	29.00 (97.93)

Department of Agricultural Engineering

Dates of Test: June 12-22, 1984

Manufacturer: J. I. CASE COMPANY, 700 State Street, Racine, Wisconsin 53404

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8402 **Fuel weight** 6.996 lbs/gal *(0.838 kg/l)* **Oil SAE** 30 **API service classification** SF, CD **To motor** 5.513 gal *(20.870 l)* **Drained from motor** 5.076 gal *(19.214 l)* **Transmission and final drive lubricant** Case Powergard PTF transmission fluid **Front axle lubricant** SAE 90 EP **Total time engine was operated** 38.0 hours.

ENGINE: **Make** Case Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *10356311* **Crankshaft** lengthwise **Rated rpm** 2100 **Bore and stroke** 4.625" × 5.0" *(117.5 mm × 127 mm)* **Compression ratio** 15.8 to 1 **Displacement** 504 cu in *(8259 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** two full flow cartridges **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper cartridges and prestrainer **Muffler** vertical **Cooling medium temperature control** two thermostats.

CHASSIS: **Type** all wheel drive with constant mesh front axle **Serial No.** *9933474* **Tread width** rear 64" *(1626 mm)* to 88" *(2235 mm)* front 75.4" *(1915 mm)* to 91.1" *(2314 mm)* **Wheel base** 104" *(2642 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 50.3" *(1278 mm)* Vertical distance above roadway 39.3" *(998 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (3) range operator controlled powershift **Advertised speeds mph (km/h)** first 2.0 *(3.2)* second 2.6 *(4.2)* third 3.3 *(5.3)* fourth 3.4 *(5.5)* fifth 4.5 *(7.2)* sixth 5.0 *(8.0)* seventh 5.6 *(9.0)* eighth 6.7 *(10.8)* ninth 8.4 *(13.5)* tenth 10.2 *(16.4)* eleventh 13.6 *(21.9)* twelfth 18.8 *(30.3)* reverse 3.3 *(5.3)*, 5.6 *(9.0)*, 8.4 *(13.5)* **Clutch** wet multiple disc hydraulically power actuated by foot pedal **Brakes** wet multiple disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 178" *(4.52 m)* left 178" *(4.52 m)* (on concrete surface without brake) right 242" *(6.15 m)* left 242" *(6.15 m)* **Turning space diameter** (on concrete surface with brake applied) right 387" *(9.82 m)* left 387" *(9.82 m)* (on concrete surface without brake) right 505" *(12.82 m)* left 505" *(12.82 m)* **Power take-off** 998 rpm at 2100 engine rpm.

LUGGING ABILITY IN 7th (2-3) GEAR

Crankshaft Speed rpm	2100	1889	1682	1470	1257	1055
Pull—lbs (kN)	9372 (41.69)	10242 (45.56)	10757 (48.22)	11096 (49.36)	10897 (48.44)	10025 (44.93)
Increase in Pull %	0	9	15	18	15	7
Power—Hp (kW)	143.68 (107.14)	140.48 (104.76)	130.85 (97.57)	117.22 (87.41)	98.10 (73.16)	76.80 (57.27)
Speed—Mph (km/h)	5.75 (9.25)	5.14 (8.28)	4.56 (7.34)	3.98 (6.40)	3.40 (5.48)	2.87 (4.62)
Slip %	3.86	4.28	4.78	4.94	4.94	4.28

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Maximum Available Power—Two Hours	75.5
75% of Pull at Maximum Power—Ten Hours	76.5
50% of Pull at Maximum Power—Two Hours	76.0
50% of Pull at Reduced Engine Speed—Two Hours	74.0
Bystander in 12th (4-3) gear	84.5

TIRES, BALLAST AND WEIGHT		As Tested	Pretest
Rear Tires	—No., size, ply & psi (kPa)	Two 20.8R38; 8; 16 *(110)*	Two 20.8R38; 8; 16 *(110)*
Ballast	—Liquid (each)	None	None
	—Test Equip. (each)	140 lb *(64 kg)*	None
Front Tires	—No., size, ply & psi (kPa)	Two 16.9-28; 10; 28 *(193)*	Two 16.9-28; 10; 28 *(193)*
*Ballast	—Liquid (each)	None	None
	—Test Equip. (each)	65 lb *(29 kg)*	None
Height of Drawbar		22.5 in *(570 mm)*	22.5 in *(570 mm)*
Static Weight with Operator	—Rear	9680 lb *(4391 kg)*	9400 lb *(4264 kg)*
	—Front	8300 lb *(3765 kg)*	8515 lb *(3862 kg)*
	—Total	17980 lb *(8156 kg)*	17915 lb *(8126 kg)*

*Fluid was drained from front tires when test equipment was added to keep total weight below manufacturer's allowed gross vehicle weight of 18,000 lbs. *(8165 kg)*.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 171°F *(77.0°C)*. Eight gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

NOTE: This tractor is shipped from the factory with standard equipment consisting of: 3 point hitch Quick attaching coupler, front weight bracket, 12-100 lb *(45 kg)* front weights and fluid filled front tires. This weight with operator and full fuel tank is shown as the pretest weight.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1528, July 19, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Case 3294 Powershift Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1530 — CASE 4994 POWERSHIFT DIESEL 12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—991 rpm)								
344.04 *(256.55)*	2100	20.206 *(76.481)*	0.410 *(0.249)*	17.03 *(3.354)*	175 *(79.2)*	67 *(19.4)*	75 *(24.0)*	28.87 *(97.48)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
308.69 *(230.19)*	2217	18.908 *(71.571)*	0.427 *(0.260)*	16.33 *(3.216)*	174 *(78.6)*	66 *(18.9)*	75 *(23.4)*	....
0.00 *(0.00)*	2341	5.222 *(19.763)*	....	....	170 *(76.4)*	66 *(18.9)*	74 *(23.1)*	....
159.04 *(118.60)*	2286	12.245 *(46.352)*	0.537 *(0.327)*	12.99 *(2.559)*	172 *(77.5)*	66 *(18.9)*	75 *(23.9)*	....
346.62 *(258.47)*	2100	20.215 *(76.520)*	0.407 *(0.247)*	17.15 *(3.378)*	174 *(78.9)*	66 *(18.9)*	75 *(23.6)*	....
80.72 *(60.19)*	2319	9.983 *(37.788)*	0.863 *(0.525)*	8.09 *(1.593)*	171 *(77.2)*	67 *(19.4)*	77 *(25.0)*	....
235.26 *(175.43)*	2254	15.295 *(57.895)*	0.453 *(0.276)*	15.38 *(3.030)*	173 *(78.3)*	66 *(18.9)*	74 *(23.3)*	....
Av 188.38 Av *(140.48)*	2253	13.644 *(51.648)*	0.505 *(0.307)*	13.81 *(2.720)*	172 *(77.8)*	66 *(19.0)*	75 *(23.8)*	28.87 *(97.58)*

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 9th Gear											
294.24 *(219.42)*	18142 *(80.70)*	6.08 *(9.79)*	2100	3.86	20.057 *(75.925)*	0.475 *(0.289)*	14.67 *(2.890)*	181 *(82.5)*	65 *(18.3)*	78 *(25.6)*	29.00 *(97.91)*
75% of Pull at Maximum Power—Ten Hours 9th Gear											
244.29 *(182.17)*	14037 *(62.44)*	6.53 *(10.50)*	2228	2.77	17.617 *(66.688)*	0.503 *(0.306)*	13.87 *(2.732)*	180 *(82.3)*	70 *(21.3)*	84 *(29.1)*	28.91 *(97.62)*
50% of Pull at Maximum Power—Two Hours 9th Gear											
168.04 *(125.31)*	9359 *(41.63)*	6.73 *(10.84)*	2276	1.76	13.799 *(52.234)*	0.573 *(0.348)*	12.18 *(2.399)*	179 *(81.7)*	68 *(19.7)*	81 *(27.2)*	29.01 *(97.96)*
50% of Pull at Reduced Engine Speed—Two Hours 9th Gear											
168.04 *(125.31)*	9359 *(41.63)*	6.73 *(10.84)*	1365	1.76	10.896 *(41.246)*	0.452 *(0.275)*	15.42 *(3.038)*	179 *(81.7)*	67 *(19.2)*	83 *(28.3)*	29.01 *(97.96)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
257.77 *(192.22)*	34519 *(153.55)*	2.80 *(4.51)*	2211	14.83	2nd Gear	177 *(80.6)*	66 *(18.9)*	72 *(22.2)*	28.73 *(97.02)*
279.38 *(208.33)*	31388 *(139.62)*	3.34 *(5.37)*	2099	9.75	3rd Gear	179 *(81.7)*	70 *(21.1)*	78 *(25.6)*	28.73 *(97.08)*
299.60 *(223.41)*	26920 *(119.73)*	4.17 *(6.72)*	2097	6.19	4th Gear	180 *(82.2)*	65 *(18.3)*	71 *(21.7)*	28.93 *(97.69)*
301.66 *(224.95)*	22225 *(98.86)*	5.09 *(8.19)*	2101	4.81	5th Gear	181 *(82.5)*	65 *(18.3)*	72 *(22.2)*	28.93 *(97.69)*
303.78 *(226.53)*	18716 *(83.25)*	6.09 *(9.80)*	2100	3.71	6th Gear	181 *(82.5)*	66 *(18.9)*	74 *(23.3)*	28.94 *(97.73)*
306.43 *(228.51)*	15968 *(71.03)*	7.20 *(11.58)*	2101	3.23	7th Gear	180 *(82.2)*	66 *(18.9)*	73 *(22.8)*	28.94 *(97.73)*
300.95 *(224.42)*	12987 *(57.77)*	8.69 *(13.99)*	2100	2.50	8th Gear	180 *(82.2)*	66 *(18.9)*	74 *(23.3)*	28.94 *(97.73)*

LUGGING ABILITY IN 6th GEAR

Crankshaft Speed rpm	2100	1890	1678	1466	1262	1052
Pull—lbs *(kN)*	18716 *(83.25)*	20057 *(89.90)*	21607 *(96.85)*	22155 *(99.30)*	21644 *(97.01)*	20379 *(91.34)*
Increase in Pull %	0	7	15	18	16	9
Power—Hp *(kW)*	303.78 *(226.53)*	291.78 *(217.58)*	277.89 *(207.22)*	248.27 *(185.14)*	209.28 *(156.06)*	164.40 *(122.60)*
Speed—Mph *(km/h)*	6.09 *(9.80)*	5.46 *(8.78)*	4.82 *(7.76)*	4.20 *(6.76)*	3.63 *(5.84)*	3.03 *(4.87)*
Slip %	3.71	4.18	4.49	4.81	4.40	4.49

Department of Agricultural Engineering

Dates of Test: June 9-27, 1984

Manufacturer: J. I. CASE COMPANY, 700 State Street, Racine, Wisconsin 53404

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8377 **Fuel weight** 6.975 lbs/gal *(0.836 kg/l)* **Oil SAE** 30 **API service classification** SF, CD **To motor** 6.351 gal *(24.043 l)* **Drained from motor** 5.117 gal *(19.369 l)* **Transmission lubricant** API service class CD engine oil certified to T0-2 **Hydraulic fluid** Case TCH fluid **Final drive lubricant** Case FDL fluid **Total time engine was operated** 39.5 hours.

ENGINE: **Make** SAAB-Scania Diesel **Type** eight cylinder vee with turbocharger **Serial No.** 5521227 **Crankshaft** lengthwise **Rated rpm** 2100 **Bore and stroke** 5.00" × 5.51" *(127 mm × 140 mm)* **Compression ratio** 15.5 to 1 **Displacement** 866 cu in *(14191 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** full flow centrifugal, separate cartridge for turbocharger oil **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for transmission oil **Fuel filter** four paper cartridges and prestrainer **Muffler** underhood **Exhaust** vertical **Cooling medium temperature control** two thermostats.

CHASSIS: **Type** four wheel drive with duals **Serial No.** *8865228* **Tread width** rear 96.1" *(2441 mm)* to 155.5" *(3950 mm)* front 96.1" *(2441 mm)* to 155.5" *(3950 mm)* **Wheel base** 124.8" *(3170 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 72.5" *(1842 mm)* Vertical distance above roadway 44.0" *(1118 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Advertised speeds mph (km/h)** first 2.5 *(4.0)* second 3.0 *(4.8)* third 3.5 *(5.7)* fourth 4.2 *(6.8)* fifth 5.1 *(8.2)* sixth 6.1 *(9.9)* seventh 7.1 *(11.4)* eighth 8.1 *(13.0)* ninth 10.1 *(16.2)* tenth 12.1 *(19.5)* eleventh 14.5 *(23.4)* twelfth 17.2 *(27.7)* reverse 3.1 *(5.0)*, 8.9 *(14.4)* **Clutch** multiple wet disc hydraulically power actuated and operated by foot pedal **Brakes** dual caliper disc hydraulically operated by foot pedal and mechanically by hand lever **Steering** hydrostatic for front wheels, electro hydraulic for rear wheels, front and rear wheels may be steered independently or together **Turning radius** (on concrete surface with front wheel steering) right 353.3 *(8.97 m)* left 353.3 *(8.97 m)* (on concrete surface with four wheel steering) right 221.8" *(5.63 m)* left 221.8" *(5.63 m)* **Turning space diameter** (on concrete surface with front wheel steering) right 751.5" *(19.09 m)* left 751.5" *(19.09 m)* (on concrete surface with four wheel steering) right 492.8" *(12.52 m)* left 492.8" *(12.52 m)* **Power take-off** 991 rpm at 2100 engine rpm.

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Maximum Available Power—Two Hours	76.5
75% of Pull at Maximum Power—Ten Hours	75.5
50% of Pull at Maximum Power—Two Hours	74.5
50% of Pull at Reduced Engine Speed—Two Hours	73.5
Bystander in 12th gear	90.0

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Inner Two 24.5-32; 10; 16 *(110)* Outer Two 24.5-32; 10; 12 *(85)*	Inner Two 24.5-32; 10; 16 *(110)* Outer Two 24.5-32; 10; 12 *(85)*
Ballast	—Liquid (each inner)	1662 lb *(753 kg)*	None
	—Effect of front wts (each)	–345 lb *(–156 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Inner Two 24.5-32; 10; 18 *(125)* Outer Two 24.5-32; 10; 14 *(95)*	Inner Two 24.5-32; 10; 18 *(125)* Outer Two 24.5-32; 10; 14 *(95)*
Ballast	—Liquid (each inner)	1745 lb *(791 kg)*	None
	—Effect of front wts (each)	795 lb *(361 kg)*	None
Height of Drawbar		22.5 in *(570 mm)*	22.5 in *(570 mm)*
Static Weight with Operator	—Rear	15080 lb *(6831 kg)*	13115 lb *(5949 kg)*
	—Front	24870 lb *(11281 kg)*	18200 lb *(8255 kg)*
	—Total	39930 lb *(18112 kg)*	31315 lb *(14204 kg)*

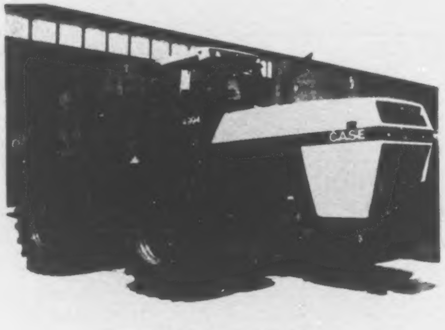
REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 144°F *(62.2°C)*. Seven gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1530, July 20, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Case 4994 Powershift Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1507
FORD 1910 (12x4) MANUAL DIESEL
12 SPEED

POWER TAKE-OFF PERFORMANCE

	Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours (PTO Speed—560 rpm)									
	28.60 (21.33)	2500	2.236 (8.463)	0.547 (0.333)	12.79 (2.520)	186 (85.6)	57 (13.9)	75 (23.9)	28.81 (97.57)
Standard Power Take-off Speed (540 rpm)—One Hour									
	28.29 (21.09)	2456	2.186 (8.275)	0.541 (0.329)	12.94 (2.549)	187 (86.2)	57 (13.9)	75 (23.9)	28.78 (97.46)
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
	25.09 (18.71)	2560	1.946 (7.367)	0.543 (0.330)	12.89 (2.540)	178 (80.8)	58 (14.2)	78 (25.3)	— —
	0.00 (0.00)	2697	0.785 (2.970)	— —	— —	161 (71.9)	57 (13.6)	74 (23.3)	— —
	12.86 (9.59)	2644	1.320 (4.996)	0.719 (0.437)	9.73 (1.917)	165 (73.6)	57 (13.9)	75 (23.9)	— —
	28.63 (21.35)	2501	2.246 (8.501)	0.549 (0.334)	12.75 (2.511)	185 (85.0)	56 (13.3)	74 (23.1)	— —
	6.49 (4.84)	2670	1.029 (3.895)	1.109 (0.675)	6.31 (1.243)	164 (73.3)	56 (13.2)	76 (24.4)	— —
	19.08 (14.23)	2614	1.603 (6.068)	0.588 (0.358)	11.90 (2.345)	170 (76.7)	58 (14.4)	74 (23.3)	— —
Av Av	15.36 (11.45)	2614	1.488 (5.634)	0.678 (0.412)	10.32 (2.033)	171 (77.2)	57 (13.9)	75 (24.2)	28.78 (97.46)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 9th (3-3) Gear											
24.76 (18.47)	1630 (7.25)	5.70 (9.17)	2498	6.04	2.222 (8.411)	0.628 (0.382)	11.14 (2.195)	176 (79.7)	48 (8.9)	53 (11.9)	28.64 (96.98)
75% of Pull at Maximum Power—Ten Hours 9th (3-3) Gear											
20.16 (15.04)	1250 (5.56)	6.02 (9.69)	2601	4.71	1.856 (7.027)	0.644 (0.392)	10.86 (2.140)	171 (77.2)	46 (8.0)	48 (8.8)	28.74 (97.33)
50% of Pull at Maximum Power—Two Hours 9th (3-3) Gear											
13.83 (10.31)	839 (3.73)	6.18 (9.95)	2635	3.27	1.508 (5.707)	0.763 (0.464)	9.17 (1.807)	170 (76.9)	51 (10.8)	57 (13.9)	28.60 (96.85)
50% of Pull at Reduced Engine Speed—Two Hours 11th (4-2) Gear											
13.82 (10.31)	838 (3.73)	6.19 (9.96)	1840	3.19	1.129 (4.273)	0.571 (0.348)	12.24 (2.413)	166 (74.2)	51 (10.6)	55 (12.5)	28.56 (96.73)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
21.21 (15.82)	3340 (14.86)	2.38 (3.83)	2501	14.85	6th (2-3) Gear	173 (78.3)	45 (7.2)	51 (10.6)	28.56 (96.71)
24.16 (18.02)	2857 (12.71)	3.17 (5.11)	2500	11.90	7th (3-1) Gear	175 (79.4)	46 (7.8)	52 (11.1)	28.56 (96.71)
25.10 (18.72)	2110 (9.38)	4.46 (7.18)	2499	7.90	8th (3-2) Gear	174 (78.6)	46 (7.8)	52 (11.1)	28.56 (96.71)
25.43 (18.96)	1675 (7.45)	5.69 (9.16)	2499	6.19	9th (3-3) Gear	175 (79.2)	47 (8.3)	53 (11.7)	28.56 (96.71)
25.57 (19.07)	1414 (6.29)	6.78 (10.92)	2500	5.11	10th (4-1) Gear	175 (79.4)	47 (8.3)	53 (11.7)	28.53 (96.62)
24.78 (18.48)	974 (4.33)	9.54 (15.35)	2500	3.88	11th (4-2) Gear	176 (79.7)	47 (8.3)	53 (11.7)	28.53 (96.60)

Department of Agricultural Engineering

Dates of Test: March 30 to April 12, 1984

Manufacturer: ISHIKAWAJIMA-SHIBAURA MACHINERY COMPANY, LTD., Tokyo, Japan

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8405 **Fuel weight** 6.996 lbs/gal *(0.839 kg/l)* **Oil SAE** 30 **API service classification** SE, SF, CC, CD **To motor** 1.605 gal *(6.077 l)* **Drained from motor** 1.442 gal *(5.459 l)* **Transmission and final drive lubricant** Ford 134 fluid **Total time engine was operated** 41.5 hours.

ENGINE: **Make** Shibaura Diesel **Type** three cylinder vertical **Serial No.** *T855A-10465* **Crankshaft** lengthwise **Rated rpm** 2500 **Bore and stroke** 3.346" × 3.937" *(85 mm × 100 mm)* **Compression ratio** 21 to 1 **Displacement** 103.9 cu in *(1703 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** one paper element **Oil filter** one full flow cartridge **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** standard **Serial No.** *1910*UP00255* **Tread width** rear 45.7" *(1161 mm)* to 61.0" *(1549 mm)* front 43.5" *(1105 mm)* to 57.5" *(1461 mm)* **Wheel base** 66.3" *(1684 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 26.0" *(660 mm)* Vertical distance above roadway 27.5" *(699 mm)* Horizontal distance from center of rear wheel tread 0.1" *(2.5 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph** *(km/h)* first 0.7 *(1.1)* second 1.0 *(1.6)* third 1.2 *(1.9)* fourth 1.6 *(2.6)* fifth 2.2 *(3.5)* sixth 2.8 *(4.5)* seventh 3.7 *(6.0)* eighth 5.0 *(8.0)* ninth 6.2 *(10.0)* tenth 7.3 *(11.7)* eleventh 9.9 *(15.9)* twelfth 12.5 *(20.1)* reverse 0.8 *(1.3)*, 1.9 *(3.0)*, 4.3 *(6.9)*, 8.6 *(13.8)* **Clutch** single dry disc operated by foot pedal **Brakes** drum and shoe operated by two foot pedals which can be locked together **Steering** mechanical **Turning radius** (on concrete surface with brake applied) right 95.5" *(2.43 m)* left 95.5" *(2.43 m)* (on concrete surface without brake) right 104.5" *(2.65 m)* left 104.5" *(2.65 m)* **Turning space diameter** (on concrete surface with brake applied) right 199" *(5.05 m)* left 199" *(5.05 m)* (on concrete surface without brake) right 215" *(5.45 m)* left 215" *(5.45 m)* **Power take-off** 540 rpm at 2456 engine rpm.

LUGGING ABILITY IN 9th (3-3) GEAR

Crankshaft Speed rpm	2499	2251	1998	1754	1499	1254
Pull—lbs (kN)	1675 (7.45)	1737 (7.73)	1851 (8.23)	1867 (8.31)	1908 (8.49)	1868 (8.31)
Increase in Pull %	0	4	11	11	14	11
Power—Hp (kW)	25.43 (18.96)	23.66 (17.64)	22.32 (16.64)	19.73 (14.72)	17.15 (12.79)	13.90 (10.36)
Speed—Mph (km/h)	5.69 (9.16)	5.11 (8.22)	4.52 (7.28)	3.96 (6.38)	3.37 (5.42)	2.79 (4.49)
Slip %	6.19	6.55	6.85	7.05	7.15	6.75

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)
Maximum Available Power—Two Hours	91.5
75% of Pull at Maximum Power—Ten Hours	91.0
50% of Pull at Maximum Power—Two Hours	91.0
50% of Pull at Reduced Engine Speed—Two Hours	86.0
Bystander in 12th (4-3) gear	82.5

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 13.6-24; 4; 14 (97)	Two 13.6-24; 4; 14 (97)
Ballast	—Liquid (each)	360 lb (163 kg)	None
	—Cast Iron (each)	220 lb (100 kg)	None
Front Tires	—No., size, ply & psi (kPa)	Two 5.50-16; 4; 40 (276)	Two 5.50-16; 4; 40 (276)
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	55 lb (25 kg)	None
Height of Drawbar		16 in (406 mm)	16 in (406 mm)
Static Weight with Operator—Rear		3040 lb (1379 kg)	1880 lb (853 kg)
—Front		1210 lb (549 kg)	1100 lb (499 kg)
—Total		4250 lb (1928 kg)	2980 lb (1352 kg)

Ford 1910 (12x4) Manual Diesel

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 135°F *(57.0°C)*. Six gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1507, June 14, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1508
FORD 1910 (12x4) SYNCHRO DIESEL
12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crankshaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—580 rpm)								
28.52 (21.27)	2500	2.261 (8.560)	0.555 (0.338)	12.61 (2.485)	194 (90.1)	61 (16.1)	75 (23.9)	28.80 (97.53)
Standard Power Take-off Speed (540 rpm)—One Hour								
28.30 (21.11)	2454	2.267 (8.581)	0.561 (0.341)	12.48 (2.460)	195 (91.1)	62 (16.7)	76 (24.4)	28.79 (97.49)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
24.97 (18.62)	2574	1.924 (7.284)	0.540 (0.328)	12.97 (2.556)	183 (83.6)	62 (16.4)	74 (23.3)	…… ……
0.00 (0.00)	2698	0.754 (2.855)	— —	— —	163 (72.8)	62 (16.4)	75 (23.9)	…… ……
12.74 (9.50)	2628	1.294 (4.899)	0.711 (0.433)	9.84 (1.938)	168 (75.3)	62 (16.4)	76 (24.2)	…… ……
28.52 (21.26)	2502	2.284 (8.647)	0.561 (0.341)	12.48 (2.459)	193 (89.4)	62 (16.7)	76 (24.2)	…… ……
6.43 (4.79)	2650	0.994 (3.764)	1.082 (0.658)	6.47 (1.274)	164 (73.3)	62 (16.7)	76 (24.4)	…… ……
18.88 (14.08)	2566	1.581 (5.986)	0.586 (0.357)	11.94 (2.352)	170 (76.7)	61 (15.8)	73 (22.8)	…… ……
Av 15.26 kW (11.38)	2603	1.472 (5.573)	0.676 (0.411)	10.38 (2.044)	173 (78.5)	62 (16.4)	75 (23.8)	28.84 (97.40)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crankshaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 9th (3-3) Gear											
24.57 (18.32)	1612 (7.17)	5.72 (9.20)	2490	5.87	2.236 (8.463)	0.637 (0.387)	10.99 (2.165)	184 (84.2)	50 (9.7)	61 (15.8)	28.94 (97.71)
75% of Pull at Maximum Power—Ten Hours 9th (3-3) Gear											
19.50 (14.54)	1219 (5.42)	6.00 (9.65)	2503	4.77	1.809 (6.846)	0.649 (0.395)	10.78 (2.124)	172 (77.6)	42 (5.6)	44 (6.9)	28.57 (96.47)
50% of Pull at Maximum Power—Two Hours 9th (3-3) Gear											
13.31 (9.93)	813 (3.61)	6.14 (9.89)	2514	3.25	1.404 (5.343)	0.770 (0.468)	9.09 (1.791)	171 (77.2)	47 (8.3)	56 (13.1)	28.40 (95.89)
50% of Pull at Reduced Engine Speed—Two Hours 11th (4-2) Gear											
13.30 (9.92)	813 (3.62)	6.14 (9.88)	1634	3.14	1.114 (4.218)	0.586 (0.357)	11.94 (2.352)	160 (71.1)	47 (8.1)	54 (12.2)	28.43 (96.00)
MAXIMUM POWER IN SELECTED GEARS											
21.92 (16.34)	3440 (15.30)	2.38 (3.83)	2566	14.95	6th (2-3) Gear			174 (78.9)	46 (7.8)	55 (12.8)	28.90 (97.87)
24.15 (18.01)	2842 (12.64)	3.19 (5.13)	2490	10.90	7th (3-1) Gear			178 (81.1)	48 (8.9)	56 (13.3)	28.88 (97.79)
25.05 (18.68)	2098 (9.33)	4.48 (7.21)	2500	7.56	8th (3-2) Gear			176 (80.0)	47 (8.3)	56 (13.6)	28.88 (97.79)
25.59 (19.08)	1681 (7.48)	5.71 (9.19)	2500	6.05	9th (3-3) Gear			176 (80.0)	46 (7.8)	53 (11.7)	28.88 (97.79)
25.62 (19.11)	1416 (6.30)	6.79 (10.92)	2500	5.12	10th (4-1) Gear			180 (81.9)	48 (8.9)	57 (13.9)	28.88 (97.79)
24.50 (18.27)	984 (4.37)	9.34 (15.04)	2500	3.74	11th (4-2) Gear			178 (81.1)	49 (9.4)	58 (14.4)	28.88 (97.79)

Department of Agricultural Engineering

Dates of Test: March 30 to April 17, 1984

Manufacturer: ISHIKAWAJIMA-SHIBAURA MACHINERY COMPANY, LTD., Tokyo, Japan

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8407 **Fuel weight** 7.000 lbs/gal *(0.839 kg/l)* **Oil SAE** 30 **API service classification** SE, SF, CC, CD **To motor** 1.533 gal *(5.802 l)* **Drained from motor** 1.379 gal *(5.220 l)* **Transmission and final drive lubricant** Ford 134 fluid **Total time engine was operated** 43.0 hours.

ENGINE: **Make** Shibaura Diesel **Type** three cylinder vertical **Serial No.** *T853A-10420* **Crankshaft** lengthwise **Rated rpm** 2500 **Bore and stroke** 3.346" × 3.937" *(85 mm × 100 mm)* **Compression ratio** 21 to 1 **Displacement** 103.9 cu in *(1703 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** one paper element **Oil filter** one full flow cartridge **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** standard **Serial No.** *1910*UP00339* **Tread width** rear 45.7" *(1161 mm)* to 61.0" *(1549 mm)* front 43.5" *(1105 mm)* to 57.5" *(1461 mm)* **Wheel base** 66.3" *(1684 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 26.4" *(671 mm)* Vertical distance above roadway 27.5" *(699 mm)* Horizontal distance from center of rear wheel tread 0.1" *(2.5 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio-Synchromesh **Advertised speeds mph (km/h)** first 0.7 *(1.1)* second 1.0 *(1.6)* third 1.2 *(1.9)* fourth 1.6 *(2.6)* fifth 2.2 *(3.5)* sixth 2.8 *(4.5)* seventh 3.7 *(6.0)* eighth 5.0 *(8.0)* ninth 6.2 *(10.0)* tenth 7.3 *(11.7)* eleventh 9.9 *(15.9)* twelfth 12.5 *(20.1)* reverse 1.0 *(1.7)*, 2.4 *(3.8)*, 5.3 *(8.5)*, 10.6 *(17.1)* **Clutch** single dry disc operated by foot pedal **Brakes** drum and shoe operated by two foot pedals which can be locked together **Steering** power assist **Turning radius** (on concrete surface with brake applied) right 96.5" *(2.45 m)* left 96.5" *(2.45 m)* (on concrete surface without brake) right 104.3" *(2.65 m)* left 104.3" *(2.65 m)* **Turning space diameter** (on concrete surface with brake applied) right 199" *(5.05 m)* left 199" *(5.05 m)* (on concrete surface without brake) right 215" *(5.45 m)* left 215" *(5.45 m)* **Power take-off** 540 rpm at 2454 engine rpm.

LUGGING ABILITY IN 9th (3-3) GEAR

Crankshaft Speed rpm	2500	2243	1996	1753	1485	1240
Pull—lbs (kN)	1681 (7.48)	1773 (7.89)	1851 (8.23)	1887 (8.39)	1904 (8.47)	1858 (8.26)
Increase in Pull %	0	5	10	12	13	11
Power—Hp (kW)	25.59 (19.08)	24.12 (17.99)	22.32 (16.65)	19.95 (14.87)	17.04 (12.71)	13.92 (10.38)
Speed—Mph (km/h)	5.71 (9.19)	5.10 (8.21)	4.52 (7.28)	3.96 (6.38)	3.36 (5.40)	2.81 (4.52)
Slip %	6.05	6.35	6.66	6.96	6.96	6.76

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)
Maximum Available Power—Two Hours	91.5
75% of Pull at Maximum Power—Ten Hours	90.5
50% of Pull at Maximum Power—Two Hours	89.5
50% of Pull at Reduced Engine Speed—Two Hours	85.0
Bystander in 12th (4-3) gear	82.0

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 13.6-24; 4; 14 (95)	Two 13.6-24; 4; 14 (95)
Ballast	—Liquid (each)	375 lb (170 kg)	None
	—Cast Iron (each)	220 lb (100 kg)	None
Front Tires	—No., size, ply & psi (kPa)	Two 5.50-16; 4; 40 (275)	Two 5.50-16; 4; 40 (275)
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	48 lb (22 kg)	None
Height of Drawbar		16 in (405 mm)	16 in (405 mm)
Static Weight with Operator—Rear		3085 lb (1399 kg)	1895 lb (860 kg)
	—Front	1240 lb (563 kg)	1145 lb (519 kg)
	—Total	4325 lb (1962 kg)	3040 lb (1379 kg)

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 132°F *(55.6°C)*. Six gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1508**, June 14, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Ford 1910 (12x4) Synchro Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1509
FORD 2110 (12x4) MANUAL DIESEL
12 SPEED

POWER TAKE-OFF PERFORMANCE

	Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours (PTO Speed—564 rpm)									
	34.79 (25.94)	2500	2.520 (9.538)	0.507 (0.308)	13.81 (2.720)	207 (97.2)	60 (15.6)	75 (23.8)	28.89 (97.54)
Standard Power Take-off Speed (540 rpm)—One Hour									
	34.91 (26.03)	2392	2.492 (9.433)	0.500 (0.304)	14.01 (2.760)	210 (98.9)	60 (15.7)	75 (24.0)	28.86 (97.46)
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
	30.31 (22.60)	2550	2.239 (8.332)	0.522 (0.317)	13.41 (2.641)	198 (91.9)	60 (15.6)	75 (23.9)	....
	0.00 (0.00)	2653	0.926 (3.505)	....	....	166 (74.4)	60 (15.6)	75 (23.9)	....
	15.46 (11.53)	2612	1.565 (5.923)	0.708 (0.431)	9.88 (1.947)	173 (78.3)	60 (15.6)	75 (23.9)	....
	34.67 (25.85)	2500	2.525 (9.558)	0.510 (0.310)	13.73 (2.705)	206 (96.7)	60 (15.6)	75 (23.9)	....
	7.81 (5.82)	2638	1.217 (4.609)	1.091 (0.664)	6.41 (1.263)	167 (75.0)	60 (15.6)	75 (23.9)	....
	22.93 (17.10)	2582	1.903 (7.205)	0.581 (0.353)	12.05 (2.373)	184 (84.2)	60 (15.6)	75 (23.9)	....
Av Av	18.53 (13.82)	2580	1.733 (6.559)	0.654 (0.398)	10.69 (2.107)	182 (83.4)	60 (15.6)	75 (23.9)	28.81 (97.29)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power—Two Hours 8th (3-2) Gear											
28.84 (21.51)	1918 (8.53)	5.64 (9.08)	2500	6.14	2.444 (9.250)	0.593 (0.361)	11.80 (2.325)	180 (81.9)	51 (10.6)	54 (11.9)	28.84 (97.37)
75% of Pull at Maximum Power—Ten Hours 8th (3-2) Gear											
23.94 (17.86)	1527 (6.79)	5.88 (9.46)	2579	5.16	2.186 (8.276)	0.639 (0.389)	10.95 (2.157)	176 (80.1)	53 (11.7)	55 (12.8)	28.52 (96.29)
50% of Pull at Maximum Power—Two Hours 8th (3-2) Gear											
16.40 (12.23)	1018 (4.53)	6.04 (9.72)	2605	3.47	1.815 (6.870)	0.774 (0.471)	9.04 (1.780)	172 (77.5)	45 (6.9)	49 (9.2)	28.41 (95.94)
50% of Pull at Reduced Engine Speed—Two Hours 10th (4-1) Gear											
16.41 (12.24)	1018 (4.53)	6.05 (9.73)	1566	3.25	1.308 (4.949)	0.558 (0.339)	12.55 (2.472)	174 (78.9)	46 (7.8)	53 (11.7)	28.41 (95.92)
MAXIMUM POWER IN SELECTED GEARS											
24.82 (18.51)	3868 (17.21)	2.41 (3.87)	2549	14.81	5th (2-2) Gear			176 (79.7)	51 (10.6)	53 (11.7)	28.86 (97.46)
29.06 (21.67)	3704 (16.47)	2.94 (4.74)	2499	13.37	6th (2-3) Gear			176 (80.0)	51 (10.6)	53 (11.7)	28.86 (97.46)
29.91 (22.31)	2618 (11.65)	4.28 (6.90)	2501	8.19	7th (3-1) Gear			181 (82.8)	50 (10.0)	52 (11.1)	28.87 (97.49)
30.61 (22.83)	2036 (9.05)	5.64 (9.08)	2500	6.14	8th (3-2) Gear			179 (81.7)	49 (9.4)	51 (10.6)	28.88 (97.52)
30.80 (22.97)	1648 (7.33)	7.01 (11.28)	2500	4.79	9th (3-3) Gear			178 (81.1)	49 (9.4)	51 (10.6)	28.88 (97.52)
30.00 (22.37)	1169 (5.20)	9.62 (15.49)	2498	3.41	10th (4-1) Gear			179 (81.4)	50 (10.0)	52 (11.1)	28.87 (97.49)

Department of Agricultural Engineering

Dates of Test: March 30 to April 13, 1984

Manufacturer: ISHIKAWAJIMA-SHIBAURA MACHINERY COMPANY, LTD., Tokyo, Japan

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8405 **Fuel weight** 6.998 lbs/gal *(0.839 kg/l)* **Oil SAE** 30 **API service classification** SE, SF, CC, CD **To motor** 1.916 gal *(7.251 l)* **Drained from motor** 1.785 gal *(6.757 l)* **Transmission and final drive lubricant** Ford 134 fluid **Total time engine was operated** 36.5 hours.

ENGINE: Make Shibaura Diesel **Type** four cylinder vertical **Serial No.** *T854B-10092* **Crankshaft** lengthwise **Rated rpm** 2500 **Bore and stroke** 3.346" × 3.937 *(85 mm × 100 mm)* **Compression ratio** 21 to 1 **Displacement** 138.5 cu in *(2270 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** one paper element **Oil filter** one full flow cartridge **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type standard **Serial No.** *2110*UV00043* **Tread width** rear 48.0" *(1219 mm)* to 71.8" *(1824 mm)* front 48.0" *(1219 mm)* to 72.0" *(1829 mm)* **Wheel base** 73.4" *(1864 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 28.2" *(716 mm)* Vertical distance above roadway 30.3" *(770 mm)* Horizontal distance from center of rear wheel tread 0.2" *(5 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph (km/h)** first 1.0 *(1.6)* second 1.3 *(2.1)* third 1.6 *(2.6)* fourth 2.3 *(3.7)* fifth 3.0 *(4.8)* sixth 3.6 *(5.8)* seventh 5.0 *(8.0)* eighth 6.4 *(10.3)* ninth 7.8 *(12.6)* tenth 10.8 *(17.4)* eleventh 13.7 *(22.0)* twelfth 16.5 *(26.6)* reverse 1.2 *(1.9)*, 2.7 *(4.3)*, 5.8 *(9.3)*, 12.5 *(20.1)* **Clutch** single dry disc operated by foot pedal **Brakes** drum and shoe operated by two foot pedals which can be locked together **Steering** power assist **Turning radius** (on concrete surface with brake applied) right 114.2" *(2.90 m)* left 114.2" *(2.90 m)* (on concrete surface without brake) right 125.0" *(3.18 m)* left 125.0" *(3.18 m)* **Turning space diameter** (on concrete surface with brake applied) right 235" *(5.96 m)* left 235" *(5.96 m)* (on concrete surface without brake) right 256" *(6.50 m)* left 256" *(6.50 m)* **Power take-off** 540 rpm at 2392 engine rpm.

LUGGING ABILITY IN 8th (3-2) GEAR

Crankshaft Speed rpm	2500	2255	1999	1750	1502	1254
Pull—lbs (kN)	2036 (9.05)	2270 (10.17)	2421 (10.85)	2432 (10.90)	2399 (10.75)	2377 (10.63)
Increase in Pull %	0	11	19	19	18	17
Power—Hp (kW)	30.61 (22.83)	30.54 (22.78)	28.71 (21.41)	25.20 (18.80)	21.37 (15.94)	17.41 (12.98)
Speed—Mph (km/h)	5.64 (9.08)	5.05 (8.12)	4.45 (7.16)	3.89 (6.25)	3.34 (5.38)	2.75 (4.42)
Slip %	6.14	6.90	7.44	7.77	7.44	7.23

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)
Maximum Available Power—Two Hours	90.5
75% of Pull at Maximum Power—Ten Hours	91.0
50% of Pull at Maximum Power—Two Hours	90.5
50% of Pull at Reduced Engine Speed—Two Hours	84.5
Bystander in 12th (4-3) gear	82.0

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 13.6-28; 4; 14 (95)	Two 13.6-28; 4; 14 (95)
Ballast	—Liquid (each)	432 lb (196 kg)	None
	—Cast Iron (each)	250 lb (113 kg)	None
Front Tires	—No., size, ply & psi (kPa)	Two 6.00-16; 4; 32 (220)	Two 6.00-16; 4; 32 (220)
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	52 lb (24 kg)	None
Height of Drawbar		16.5 in (420 mm)	16.5 in (420 mm)
Static Weight with Operator	—Rear	3650 lb (1656 kg)	2285 lb (1037 kg)
	—Front	1455 lb (660 kg)	1350 lb (612 kg)
	—Total	5106 lb (2316 kg)	3635 lb (1649 kg)

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 141°F *(60.6°C)*. Six gears were chosen between 15% slip and 10 mph *(16.1 km/h)*. During inspection, it was found that the intake valves and valve seats on cylinders 1 and 4 had adhesive wear markings (metal transfer). In cylinder No. 4, light scratches were found.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1509**, June 14, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Ford 2110 (12x4) Manual Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1510
FORD 2110 (12x4) SYNCHRO DIESEL
12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—564 rpm)								
35.11 (26.18)	2500	2.339 (8.855)	0.506 (0.308)	13.83 (2.725)	201 (94.0)	58 (14.3)	73 (22.6)	28.95 (97.76)
Standard Power Take-off Speed (540 rpm)—One Hour								
35.58 (26.53)	2394	2.339 (8.611)	0.500 (0.304)	14.01 (2.759)	206 (96.7)	58 (14.4)	76 (24.3)	28.95 (97.76)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
30.60 (22.82)	2562	2.281 (8.633)	0.522 (0.317)	13.42 (2.643)	194 (89.7)	58 (14.4)	75 (23.9)	— —
0.00 (0.00)	2650	0.950 (3.598)	— —	— —	166 (74.2)	58 (14.4)	75 (23.9)	— —
15.58 (11.62)	2612	1.582 (5.988)	0.710 (0.433)	9.85 (1.941)	171 (76.9)	57 (13.9)	75 (23.9)	— —
35.21 (26.26)	2490	2.546 (9.639)	0.506 (0.308)	13.83 (2.724)	199 (92.8)	57 (13.9)	74 (23.3)	— —
7.86 (5.86)	2635	1.230 (4.657)	1.095 (0.666)	6.39 (1.259)	167 (75.0)	58 (14.4)	77 (24.7)	— —
23.14 (17.25)	2583	1.921 (7.270)	0.581 (0.353)	12.05 (2.373)	182 (83.1)	58 (14.4)	76 (24.2)	— —
Av 18.73 Av (13.97)	2589	1.740 (6.585)	0.650 (0.395)	10.76 (2.120)	180 (81.9)	58 (14.3)	76 (24.6)	28.94 (97.73)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th (3-2) Gear											
30.10 (22.44)	1977 (8.79)	5.71 (9.19)	2500	6.85	2.558 (9.683)	0.595 (0.362)	11.77 (2.318)	182 (83.1)	46 (7.8)	57 (13.6)	28.94 (97.71)
75% of Pull at Maximum Power—Ten Hours 8th (3-2) Gear											
24.45 (18.24)	1530 (6.81)	5.99 (9.65)	2576	5.02	2.202 (8.336)	0.630 (0.383)	11.11 (2.188)	176 (79.7)	46 (8.0)	57 (13.9)	28.87 (97.49)
50% of Pull at Maximum Power—Two Hours 8th (3-2) Gear											
16.77 (12.51)	1020 (4.54)	6.17 (9.93)	2611	3.56	1.793 (6.789)	0.748 (0.455)	9.35 (1.842)	173 (78.3)	48 (8.6)	58 (14.7)	28.88 (97.52)
50% of Pull at Reduced Engine Speed—Two Hours 10th (4-1) Gear											
16.78 (12.52)	1021 (4.54)	6.17 (9.93)	1550	3.52	1.368 (5.180)	0.569 (0.346)	12.30 (2.423)	172 (77.5)	48 (8.6)	59 (15.0)	28.86 (97.46)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
29.01 (21.63)	3728 (16.58)	2.92 (4.70)	2516	14.88	6th (2-3) Gear	177 (80.3)	43 (6.1)	48 (8.9)	28.97 (97.83)
30.00 (22.40)	2625 (11.67)	4.38 (7.04)	2501	9.14	7th (3-1) Gear	176 (80.0)	45 (7.2)	51 (10.6)	28.97 (97.83)
31.01 (23.13)	2040 (9.07)	5.70 (9.18)	2500	6.91	8th (3-2) Gear	178 (81.1)	45 (7.2)	52 (11.1)	28.97 (97.83)
31.11 (23.20)	1670 (7.43)	6.99 (11.24)	2500	5.52	9th (3-3) Gear	179 (81.4)	45 (7.2)	53 (11.7)	28.97 (97.83)
30.99 (23.11)	1175 (5.23)	9.89 (15.92)	2501	3.95	10th (4-1) Gear	179 (81.7)	45 (7.2)	55 (12.8)	28.97 (97.83)

Department of Agricultural Engineering

Dates of Test: March 30 to April 9, 1984

Manufacturer: ISHIKAWAJIMA-SHIBAURA MACHINERY COMPANY, LTD., Tokyo, Japan

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8405 **Fuel weight** 6.998 lbs/gal *(0.839 kg/l)* **Oil SAE** 30 **API service classification** SE, SF, CC, CD **To motor** 1.797 gal *(6.803 l)* **Drained from motor** 1.667 gal *(6.311 l)* **Transmission and final drive lubricant** Ford 134 fluid **Total time engine was operated** 37.5 hours.

ENGINE: **Make** Shibaura Diesel **Type** four cylinder vertical **Serial No.** *T854B-10141* **Crankshaft** lengthwise **Rated rpm** 2500 **Bore and stroke** 3.346" × 3.937" *(85 mm × 100 mm)* **Compression ratio** 21 to 1 **Displacement** 138.5 cu in *(2270 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** one paper element **Oil filter** one full flow cartridge **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** standard **Serial No.** *2110*UV00085* **Tread width** rear 48.0" *(1219 mm)* to 71.8" *(1824 mm)* front 48.0" *(1219 mm)* to 72.0" *(1829 mm)* **Wheel base** 73.4" *(1864 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 28.2" *(716 mm)* Vertical distance above roadway 30.3" *(770 mm)* Horizontal distance from center of rear wheel tread 0.2" *(5 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio-Synchromesh **Advertised speeds mph (km/h)** first 1.0 *(1.6)* second 1.3 *(2.1)* third 1.6 *(2.6)* fourth 2.3 *(3.7)* fifth 3.0 *(4.8)* sixth 3.6 *(5.8)* seventh 5.0 *(8.0)* eighth 6.4 *(10.3)* ninth 7.8 *(12.6)* tenth 10.8 *(17.4)* eleventh 13.7 *(22.0)* twelfth 16.5 *(26.6)* reverse 1.4 *(2.3)*, 3.1 *(5.0)*, 6.9 *(11.1)*, 14.7 *(23.7)* **Clutch** single dry disc operated by foot pedal **Brakes** drum and shoe operated by two foot pedals which can be locked together **Steering** power assist **Turning radius** (on concrete surface with brake applied) right 114.2" *(2.90 m)* left 114.2" *(2.90 m)* (on concrete surface without brake) right 125.0" *(3.18 m)* left 125.0" *(3.18 m)* **Turning space diameter** (on concrete surface with brake applied) right 235" *(5.96 m)* left 235" *(5.96 m)* (on concrete surface without brake) right 256" *(6.50 m)* left 256" *(6.50 m)* **Power take-off** 540 rpm at 2394 engine rpm.

LUGGING ABILITY IN 8th (3-2) GEAR

Crankshaft Speed rpm	2500	2256	1987	1746	1496	1242
Pull—lbs (kN)	2040 (9.07)	2250 (10.01)	2398 (10.67)	2375 (10.56)	2450 (10.90)	2414 (10.74)
Increase in Pull %	0	10	18	16	20	18
Power—Hp (kW)	31.01 (23.13)	30.04 (22.40)	28.76 (21.45)	24.86 (18.54)	21.92 (16.35)	17.96 (13.39)
Speed—Mph (km/h)	5.70 (9.18)	5.01 (8.06)	4.50 (7.24)	3.93 (6.32)	3.36 (5.40)	2.79 (4.49)
Slip %	6.91	7.64	8.04	8.25	8.57	8.25

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)
Maximum Available Power—Two Hours	92.0
75% of Pull at Maximum Power—Ten Hours	91.5
50% of Pull at Maximum Power—Two Hours	92.0
50% of Pull at Reduced Engine Speed—Two Hours	88.5
Bystander in 12th (4-3) gear	82.5

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 13.6-28; 4; 14 (97)	Two 13.6-28; 4; 14 (97)
Ballast	—Liquid (each)	405 lb (184 kg)	None
	—Cast iron (each)	250 lb (113 kg)	None
Front Tires	—No., size, ply & psi (kPa)	Two 6.00-16; 4; 32 (220)	Two 6.00-16; 4; 32 (220)
Ballast	—Liquid (each)	None	None
	—Cast iron (each)	50 lb (23 kg)	None
Height of Drawbar		16.5 in (420 mm)	16.5 in (420 mm)
Static Weight with Operator—Rear		3650 lb (1656 kg)	2300 lb (1043 kg)
—Front		1460 lb (662 kg)	1360 lb (617 kg)
—Total		5110 lb (2318 kg)	3660 lb (1660 kg)

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 141°F *(60.6°C)*. Five gears were chosen between 15% slip and 10 mph *(16.1 km/h)*. During inspection, it was found that the intake valves and valve seats on cylinders 1, 2 and 3 had adhesive wear markings (metal transfer).

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1510**, June 14, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Ford 2110 (12x4) Synchro Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1514—FORD TW-5 DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

	Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Temperature °F (°C) Air wet bulb	Temperature °F (°C) Air dry bulb	Barometer inch Hg (kPa)
	MAXIMUM POWER AND FUEL CONSUMPTION								
	Rated Engine Speed—Two Hours (PTO Speed—1190 rpm)								
	105.74 *(78.85)*	2300	7.103 *(26.886)*	0.470 *(0.286)*	14.89 *(2.933)*	211 *(99.3)*	56 *(13.6)*	75 *(23.7)*	29.07 *(98.18)*
	Standard Power Take-off Speed (1000 rpm)—One Hour								
	96.83 *(72.20)*	1919	6.241 *(23.621)*	0.451 *(0.274)*	15.52 *(3.057)*	206 *(96.7)*	57 *(13.9)*	75 *(23.9)*	29.06 *(98.11)*
	VARYING POWER AND FUEL CONSUMPTION—Two Hours								
	92.13 *(68.70)*	2358	6.239 *(23.618)*	0.474 *(0.288)*	14.77 *(2.909)*	202 *(94.4)*	57 *(13.6)*	75 *(23.6)*	....
	0.00 *(0.00)*	2436	2.075 *(7.856)*	....	....	183 *(83.6)*	57 *(13.9)*	76 *(24.4)*	....
	46.98 *(35.04)*	2406	3.949 *(14.950)*	0.588 *(0.358)*	11.90 *(2.344)*	189 *(86.9)*	58 *(14.2)*	75 *(23.6)*	....
	107.19 *(79.93)*	2300	7.161 *(27.107)*	0.467 *(0.284)*	14.97 *(2.949)*	213 *(100.3)*	57 *(13.9)*	74 *(23.3)*	....
	23.66 *(17.64)*	2423	2.942 *(11.135)*	0.870 *(0.529)*	8.04 *(1.584)*	184 *(84.4)*	58 *(14.2)*	75 *(23.6)*	....
	69.91 *(52.13)*	2387	4.996 *(18.910)*	0.500 *(0.304)*	13.99 *(2.757)*	194 *(90.0)*	58 *(14.4)*	75 *(23.9)*	....
Av *Av*	**56.65** *(42.24)*	**2385**	**4.560** *(17.263)*	**0.563** *(0.343)*	**12.42** *(2.447)*	**194** *(90.0)*	**57** *(14.0)*	**75** *(23.8)*	**29.04** *(98.06)*

DRAWBAR PERFORMANCE WITH BIAS PLY TIRES

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Temp. °F (°C) Air wet bulb	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th (5L) Gear											
92.62 *(69.07)*	6453 *(28.70)*	5.38 *(8.66)*	2299	5.60	7.047 *(26.675)*	0.532 *(0.324)*	13.14 *(2.589)*	217 *(102.8)*	60 *(15.6)*	70 *(20.8)*	28.59 *(96.53)*
75% of Pull at Maximum Power—Ten Hours 8th (5L) Gear											
74.90 *(55.85)*	4960 *(22.06)*	5.66 *(9.11)*	2378	3.90	5.802 *(21.963)*	0.542 *(0.330)*	12.91 *(2.543)*	206 *(96.4)*	62 *(16.7)*	70 *(21.1)*	28.96 *(97.80)*
50% of Pull at Maximum Power—Two Hours 8th (5L) Gear											
51.33 *(38.28)*	3308 *(14.71)*	5.82 *(9.37)*	2411	2.60	4.510 *(17.071)*	0.615 *(0.374)*	11.38 *(2.242)*	198 *(91.9)*	63 *(17.2)*	75 *(23.9)*	28.60 *(96.58)*
50% of Pull at Reduced Engine Speed—Two Hours 11th (6L) Gear											
51.27 *(38.23)*	3307 *(14.71)*	5.81 *(9.36)*	1558	2.60	3.631 *(13.743)*	0.495 *(0.301)*	14.12 *(2.782)*	195 *(90.3)*	65 *(18.3)*	80 *(26.4)*	28.61 *(96.61)*
MAXIMUM POWER IN SELECTED GEARS											
82.80 *(61.74)*	12249 *(54.48)*	2.53 *(4.08)*	2333	14.67	3rd (2L) Gear			208 *(97.8)*	51 *(10.6)*	56 *(13.3)*	28.56 *(96.44)*
89.79 *(66.95)*	10146 *(45.13)*	3.32 *(5.34)*	2302	9.92	4th (3L) Gear			217 *(102.5)*	52 *(11.1)*	58 *(14.4)*	28.56 *(96.44)*
89.35 *(66.63)*	9842 *(43.78)*	3.40 *(5.48)*	2300	9.50	5th (2H) Gear			214 *(101.1)*	52 *(11.1)*	59 *(15.0)*	28.56 *(96.44)*
90.60 *(67.63)*	7711 *(34.30)*	4.41 *(7.10)*	2300	7.01	6th (3H) Gear			217 *(102.5)*	53 *(11.7)*	60 *(15.6)*	28.57 *(96.48)*
93.13 *(69.45)*	7618 *(33.88)*	4.58 *(7.38)*	2299	6.86	7th (4L) Gear			217 *(102.8)*	54 *(12.2)*	61 *(16.1)*	28.57 *(96.48)*
94.89 *(70.76)*	6613 *(29.41)*	5.38 *(8.66)*	2300	5.64	8th (5L) Gear			219 *(103.6)*	57 *(13.9)*	65 *(18.3)*	28.56 *(96.44)*
91.85 *(68.49)*	5717 *(25.43)*	6.02 *(9.70)*	2300	4.70	9th (4H) Gear			217 *(102.8)*	54 *(12.2)*	61 *(16.1)*	28.58 *(96.51)*
94.14 *(70.20)*	5024 *(22.35)*	7.03 *(11.31)*	2298	3.98	10th (5H) Gear			218 *(103.1)*	54 *(12.2)*	61 *(16.1)*	28.57 *(96.48)*
95.27 *(71.04)*	4196 *(18.66)*	8.52 *(13.70)*	2299	3.34	11th (6L) Gear			217 *(102.8)*	55 *(12.8)*	61 *(16.1)*	28.56 *(96.44)*

Department of Agricultural Engineering

Dates of Test: April 26 to May 16, 1984

Manufacturer: FORD MOTOR COMPANY, 2500 Maple Road, Troy, Michigan 48084

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8402 **Fuel weight** 6.996 lbs/gal *(0.838 kg/l)* **Oil SAE** 30 **API service classification** SE, CC, CD **To motor** 4.224 gal *(15.989 l)* **Drained from motor** 3.772 gal *(14.278 l)* **Transmission and final drive lubricant** Ford 134 fluid **Total time engine was operated** 53.0 hours.

ENGINE: **Make** Ford Diesel **Type** six cylinder vertical **Serial No.** *G733576* **Crankshaft** lengthwise **Rated rpm** 2300 **Bore and stroke** 4.4" × 4.4" *(112 mm × 112 mm)* **Compression ratio** 16.3 to 1 **Displacement** 401 cu in *(6572 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and centrifugal precleaner **Oil filter** one full flow cartridge **Oil cooler** heat exchanger in lower part of radiator for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element and sediment bowl **Muffler** vertical **Cooling medium temperature control** two thermostats and variable speed fan.

CHASSIS: **Type** standard with duals **Serial No.** *C713304* **Tread width** rear 60" *(1524 mm)* to 120" *(3048 mm)* front 60" *(1524 mm)* to 84" *(2134 mm)* **Wheel base** 109.7" *(2786 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 29.3" *(745 mm)* Vertical distance above roadway 42.8" *(1087 mm)* Horizontal distance from center of rear wheel tread 0.2" *(5 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph** *(km/h)* first 2.0 *(3.1)* second 2.5 *(4.0)* third 3.0 *(4.8)* fourth 3.8 *(6.1)* fifth 3.9 *(6.2)* sixth 4.9 *(7.8)* seventh 5.1 *(8.1)* eighth 5.9 *(9.4)* ninth 6.5 *(10.5)* tenth 7.5 *(12.1)* eleventh 9.1 *(14.6)* twelfth 11.4 *(18.4)* thirteenth 11.7 *(18.8)* fourteenth 14.7 *(23.6)* fifteenth 15.2 *(24.5)* sixteenth 19.6 *(31.5)* reverse 2.1 *(3.4)*, 2.7 *(4.4)*, 6.3 *(10.2)*, 8.1 *(13.1)* **Clutch** single dry disc operated by foot pedal **Brakes** single wet disc hydraulically operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 159.6" *(4.05 m)* left 159.6" *(4.05 m)* (on concrete surface without brake) right 174" *(4.42 m)* left 174" *(4.42 m)* **Turning space diameter** (on

DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Temp. °F (°C) Air wet bulb	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th (5L) Gear											
93.75 *(69.91)*	6445 *(28.67)*	5.46 *(8.78)*	2300	3.41	6.983 *(26.432)*	0.521 *(0.317)*	13.43 *(2.645)*	214 *(101.1)*	61 *(16.1)*	68 *(19.7)*	29.07 *(98.17)*
MAXIMUM POWER IN SELECTED GEARS											
76.98 *(57.40)*	13718 *(61.02)*	2.10 *(3.39)*	2342	14.34	2nd (1H) Gear			202 *(94.2)*	54 *(12.2)*	60 *(15.6)*	29.10 *(98.27)*
90.28 *(67.32)*	12866 *(57.23)*	2.63 *(4.23)*	2301	9.26	3rd (2L) Gear			209 *(98.1)*	55 *(12.8)*	62 *(16.7)*	29.11 *(98.30)*
93.49 *(69.72)*	10187 *(45.31)*	3.44 *(5.54)*	2299	5.72	4th (3L) Gear			208 *(97.8)*	56 *(13.3)*	63 *(17.2)*	29.12 *(98.33)*
92.86 *(69.25)*	9877 *(43.93)*	3.53 *(5.67)*	2300	5.41	5th (2H) Gear			210 *(98.9)*	56 *(13.3)*	63 *(17.2)*	29.12 *(98.33)*
93.15 *(69.46)*	7764 *(34.53)*	4.50 *(7.24)*	2299	4.17	6th (3H) Gear			212 *(99.7)*	56 *(13.3)*	63 *(17.2)*	29.12 *(98.33)*
94.23 *(70.27)*	7555 *(33.60)*	4.68 *(7.53)*	2300	3.93	7th (4L) Gear			215 *(101.4)*	56 *(13.3)*	64 *(17.8)*	29.13 *(98.37)*
95.89 *(71.51)*	6592 *(29.32)*	5.45 *(8.78)*	2300	3.45	8th (5L) Gear			215 *(101.4)*	57 *(13.9)*	65 *(18.3)*	29.14 *(98.40)*
92.65 *(69.09)*	5721 *(25.45)*	6.07 *(9.77)*	2299	2.88	9th (4H) Gear			213 *(100.6)*	56 *(13.3)*	64 *(17.8)*	29.13 *(98.37)*
94.41 *(70.40)*	5012 *(22.29)*	7.06 *(11.37)*	2300	2.72	10th (5H) Gear			214 *(100.8)*	56 *(13.3)*	64 *(17.8)*	29.13 *(98.37)*
93.67 *(69.85)*	4117 *(18.31)*	8.53 *(13.73)*	2301	2.23	11th (6L) Gear			214 *(101.1)*	57 *(13.9)*	65 *(18.3)*	29.14 *(98.40)*

TIRES, BALLAST AND WEIGHT		Bias Ply Tires **With Ballast**	Bias Ply Tires **Without Ballast**	Radial Ply Tires **With Ballast**	Radial Ply Tires **Without Ballast**
Rear Tires	—No., size, ply & psi *(kPa)*	Four 18.4-38; 8; 18 *(125)*	Four 18.4-38; 8; 18 *(125)*	Four 18.4R38; 8; 18 *(125)*	Four 18.4R38; 8; 18 *(125)*
Ballast	—Liquid (each inner)	585 lb *(265 kg)*	None	528 lb *(239 kg)*	None
	—Cast Iron (each)	None	None	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 11.00-16; 6; 32 *(220)*	Two 11.00-16; 6; 32 *(220)*	Two 11.00-16; 6; 32 *(220)*	Two 11.00-16; 6; 32 *(220)*
Ballast	—Liquid (each)	None	None	None	None
	—Cast Iron (each)	85 lb *(39 kg)*	None	70 lb *(32 kg)*	None
Height of Drawbar		19.5 in *(495 mm)*	19.5 in *(495 mm)*	19 in *(485 mm)*	19 in *(485 mm)*
Static Weight with Operator	—Rear	10810 lb *(4903 kg)*	9640 lb *(4373 kg)*	10855 lb *(4924 kg)*	9800 lb *(4445 kg)*
	—Front	3620 lb *(1642 kg)*	3450 lb *(1565 kg)*	3590 lb *(1628 kg)*	3450 lb *(1565 kg)*
	—Total	14430 lb *(6545 kg)*	13090 lb *(5938 kg)*	14445 lb *(6552 kg)*	13250 lb *(6010 kg)*

Ford TW-5 Diesel

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 192°F *(89.0°C)*. Nine gears were chosen between 15% slip and 10 mph *(16.1 km/h)*. This tractor did not attain the estimated 15.00 HP-HR per gallon fuel economy at rated engine speed as claimed by the manufacturer.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1514**, June 21, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

LUGGING ABILITY IN 9th (SL) GEAR

Crankshaft Speed rpm	2300	2071	1857	1607	1372	1148
Pull—lbs *(kN)*	6613 *(29.41)*	7032 *(31.61)*	7297 *(32.71)*	7541 *(33.80)*	7617 *(34.10)*	7594 *(34.04)*
Increase in Pull %	0	7	10	14	15	15
Power—Hp *(kW)*	94.89 *(70.76)*	90.65 *(67.60)*	82.96 *(61.86)*	74.74 *(55.73)*	64.43 *(48.05)*	53.71 *(40.05)*
Speed—Mph *(km/h)*	5.38 *(8.66)*	4.82 *(7.76)*	4.26 *(6.86)*	3.72 *(5.99)*	3.17 *(5.10)*	2.65 *(4.27)*
Slip %	5.64	6.02	6.49	6.63	6.83	6.78

TRACTOR SOUND LEVEL WITH CAB	Radial Ply dB(A)	Bias Ply dB(A)
Maximum Available Power—Two Hours	81.5	81.0
75% of Pull at Maximum Power—Ten Hours		81.0
50% of Pull at Maximum Power—Two Hours		81.0
50% of Pull at Reduced Engine Speed—Two Hours		80.0
Bystander in 15th (8L) gear		90.5

concrete surface with brake applied) right 324" *(8.23 m)* left 324" *(8.23 m)* (on concrete surface without brake) right 360" *(9.14 m)* left 360" *(9.14 m)* **Power take-off** 540 rpm at 1875 engine rpm and 1000 rpm at 1919 engine rpm.

REPAIRS and ADJUSTMENTS: During preliminary PTO tests, two fuel injectors were removed, adjusted and reinstalled.

NEBRASKA TRACTOR TEST 1515—FORD TW-15 DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	Fuel Consumption lb/hp.hr *(kg/kW.h)*	Fuel Consumption Hp.hr/gal *(kW.h/l)*	Temperature °F (°C) Cooling medium	Temperature °F (°C) Air wet bulb	Temperature °F (°C) Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1147 rpm)								
121.40 *(90.53)*	2200	7.694 *(29.121)*	0.443 *(0.270)*	15.78 *(3.109)*	195 *(90.4)*	64 *(17.5)*	75 *(23.9)*	28.99 *(97.89)*
Standard Power Take-off Speed (1000 rpm)—One Hour								
117.83 *(87.87)*	1918	6.973 *(26.391)*	0.414 *(0.252)*	16.90 *(3.329)*	193 *(89.4)*	65 *(18.1)*	75 *(23.9)*	28.94 *(97.73)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
108.57 *(80.96)*	2316	7.311 *(27.676)*	0.471 *(0.287)*	14.85 *(2.925)*	194 *(89.7)*	65 *(18.1)*	75 *(23.9)*	…… ……
0.00 *(0.00)*	2450	2.414 *(9.139)*	…… ……	…… ……	182 *(83.3)*	64 *(17.8)*	75 *(23.6)*	…… ……
55.68 *(41.52)*	2375	4.837 *(18.310)*	0.608 *(0.370)*	11.51 *(2.268)*	186 *(85.3)*	64 *(17.8)*	74 *(23.3)*	…… ……
121.75 *(90.79)*	2200	7.693 *(29.120)*	0.442 *(0.269)*	15.83 *(3.118)*	198 *(91.9)*	64 *(17.8)*	74 *(23.1)*	…… ……
28.12 *(20.97)*	2405	3.625 *(13.716)*	0.901 *(0.548)*	7.76 *(1.529)*	185 *(84.7)*	64 *(17.8)*	74 *(23.1)*	…… ……
82.52 *(61.54)*	2346	6.141 *(23.244)*	0.521 *(0.317)*	13.44 *(2.647)*	188 *(86.4)*	65 *(18.1)*	75 *(23.9)*	…… ……
Av 66.11 Av *(49.30)*	2345	5.337 *(20.201)*	0.565 *(0.344)*	12.39 *(2.440)*	188 *(86.9)*	64 *(17.9)*	74 *(23.5)*	28.89 *(97.56)*

DRAWBAR PERFORMANCE WITH BIAS PLY TIRES

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	Fuel Consumption lb/hp.hr *(kg/kW.h)*	Fuel Consumption Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cool-ing med	Temp. °F (°C) Air wet bulb	Temp. °F (°C) Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 8th (5L) Gear											
105.89 *(78.96)*	7778 *(34.60)*	5.11 *(8.22)*	2199	6.12	7.654 *(28.975)*	0.506 *(0.308)*	13.83 *(2.725)*	200 *(93.1)*	52 *(10.8)*	59 *(15.0)*	28.73 *(97.00)*
75% of Pull at Maximum Power—Ten Hours 8th (5L) Gear											
86.84 *(64.76)*	5903 *(26.26)*	5.52 *(8.88)*	2338	4.58	6.787 *(25.691)*	0.547 *(0.333)*	12.80 *(2.521)*	197 *(91.4)*	51 *(10.3)*	54 *(12.1)*	28.61 *(96.62)*
50% of Pull at Maximum Power—Two Hours 8th (5L) Gear											
59.64 *(44.47)*	3936 *(17.51)*	5.68 *(9.14)*	2306	3.00	5.482 *(20.751)*	0.643 *(0.391)*	10.88 *(2.143)*	193 *(89.2)*	55 *(12.5)*	64 *(17.5)*	28.73 *(97.00)*
50% of Pull at Reduced Engine Speed—Two Hours 11th (6L) Gear											
59.60 *(44.45)*	3937 *(17.51)*	5.68 *(9.14)*	1532	3.04	4.074 *(15.421)*	0.478 *(0.291)*	14.63 *(2.882)*	190 *(87.5)*	55 *(12.8)*	61 *(15.8)*	28.72 *(96.97)*
MAXIMUM POWER IN SELECTED GEARS											
88.44 *(65.95)*	13247 *(58.93)*	2.50 *(4.03)*	2317	14.89	3rd (2L) Gear			198 *(92.2)*	53 *(11.7)*	59 *(15.0)*	28.60 *(96.58)*
99.43 *(74.14)*	12072 *(53.70)*	3.09 *(4.97)*	2200	12.10	4th (3L) Gear			199 *(92.8)*	54 *(12.2)*	60 *(15.6)*	28.60 *(96.58)*
99.53 *(74.22)*	11766 *(52.34)*	3.17 *(5.10)*	2199	11.56	5th (2H) Gear			201 *(93.6)*	54 *(12.2)*	61 *(16.1)*	28.60 *(96.58)*
102.24 *(76.24)*	9214 *(40.98)*	4.16 *(6.70)*	2200	7.96	6th (3H) Gear			202 *(94.2)*	54 *(12.2)*	61 *(16.1)*	28.60 *(96.58)*
104.66 *(78.04)*	9058 *(40.29)*	4.33 *(6.97)*	2201	7.74	7th (4L) Gear			201 *(93.6)*	54 *(12.2)*	60 *(15.6)*	28.60 *(96.58)*
107.00 *(79.79)*	7871 *(35.01)*	5.10 *(8.20)*	2200	6.39	8th (5L) Gear			200 *(93.3)*	53 *(11.7)*	59 *(15.0)*	28.59 *(96.54)*
105.17 *(78.43)*	6915 *(30.76)*	5.70 *(9.18)*	2200	5.55	9th (4H) Gear			200 *(93.1)*	53 *(11.7)*	59 *(15.0)*	28.60 *(96.58)*
106.98 *(79.78)*	6008 *(26.72)*	6.68 *(10.75)*	2202	4.61	10th (5H) Gear			201 *(93.6)*	53 *(11.7)*	59 *(15.0)*	28.59 *(96.54)*
107.24 *(79.97)*	4968 *(22.10)*	8.09 *(13.03)*	2201	3.73	11th (6L) Gear			200 *(93.3)*	53 *(11.7)*	59 *(15.0)*	28.59 *(96.54)*

Department of Agricultural Engineering

Dates of Test: April 25 to May 12, 1984

Manufacturer: FORD MOTOR COMPANY, 2500 Maple Road, Troy, Michigan 48084

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8402 **Fuel weight** 6.996 lbs/gal *(0.838 kg/l)* **Oil SAE** 30 **API service classification** SE, SF, CC, CD **To motor** 4.257 gal *(16.115 l)* **Drained from motor** 3.956 gal *(14.975 l)* **Transmission and final drive lubricant** Ford 134 fluid **Total time engine was operated** 44.0 hours.

ENGINE: **Make** Ford Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *U732866* **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** 4.4" × 4.4" *(112 mm × 112 mm)* **Compression ratio** 15.6 to 1 **Displacement** 401 cu in *(6572 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and centrifugal precleaner **Oil filter** one full flow cartridge **Oil cooler** heat exchanger in lower part of radiator for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element and sediment bowl **Muffler** vertical **Cooling medium temperature control** two thermostats and variable speed fan.

CHASSIS: **Type** standard with duals **Serial No.** *C713305* **Tread width** rear 60" *(1524 mm)* to 120" *(3048 mm)* front 60" *(1524 mm)* to 84" *(2134 mm)* **Wheel base** 109.7" *(2786 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 29.3" *(745 mm)* Vertical distance above roadway 42.8" *(1087 mm)* Horizontal distance from center of rear wheel tread 0.2" *(5 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph (km/h)** first 1.9 *(3.0)* second 2.4 *(3.9)* third 2.9 *(4.6)* fourth 3.6 *(5.8)* fifth 3.7 *(5.9)* sixth 4.7 *(7.5)* seventh 4.8 *(7.8)* eighth 5.6 *(9.0)* ninth 6.2 *(10.0)* tenth 7.2 *(11.6)* eleventh 8.7 *(13.9)* twelfth 10.9 *(17.6)* thirteenth 11.1 *(17.9)* fourteenth 14.0 *(22.6)* fifteenth 14.6 *(23.4)* sixteenth 18.7 *(30.1)* reverse 2.0 *(3.2)*, 2.6 *(4.2)*, 6.1 *(9.7)*, 7.8 *(12.5)* **Clutch** single dry disc operated by foot pedal **Brakes** single wet disc hydraulically operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 159.6" *(4.05 m)* left 159.6" *(4.05 m)* (on concrete surface without brake) right 174" *(4.42 m)* left 174" *(4.42 m)* **Turning space diameter** (on

DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	Fuel Consumption lb/hp.hr *(kg/kW.h)*	Fuel Consumption Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cool-ing med	Temp. °F (°C) Air wet bulb	Temp. °F (°C) Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 8th (5L) Gear											
107.52 *(80.17)*	7772 *(34.57)*	5.19 *(8.35)*	2199	3.75	7.719 *(29.218)*	0.502 *(0.306)*	13.93 *(2.744)*	200 *(93.3)*	60 *(15.3)*	68 *(20.0)*	28.82 *(97.30)*
MAXIMUM POWER IN SELECTED GEARS											
93.32 *(69.59)*	14236 *(63.32)*	2.46 *(3.96)*	2288	14.64	3rd (2L) Gear			200 *(93.1)*	54 *(12.2)*	59 *(15.0)*	28.75 *(97.08)*
104.94 *(78.25)*	12094 *(53.79)*	3.25 *(5.24)*	2201	6.76	4th (3L) Gear			198 *(92.2)*	54 *(12.2)*	60 *(15.6)*	28.77 *(97.15)*
104.57 *(77.98)*	11770 *(52.36)*	3.33 *(5.36)*	2197	6.31	5th (2H) Gear			200 *(93.1)*	54 *(12.2)*	60 *(15.6)*	28.78 *(97.19)*
106.27 *(79.24)*	9316 *(41.44)*	4.28 *(6.88)*	2199	4.62	6th (3H) Gear			201 *(93.6)*	55 *(12.8)*	61 *(16.1)*	28.79 *(97.22)*
108.20 *(80.68)*	9114 *(40.54)*	4.45 *(7.16)*	2201	4.47	7th (4L) Gear			201 *(93.6)*	55 *(12.8)*	61 *(16.1)*	28.80 *(97.25)*
110.02 *(82.04)*	7949 *(35.36)*	5.19 *(8.35)*	2199	3.75	8th (5L) Gear			200 *(93.1)*	58 *(14.4)*	65 *(18.3)*	28.81 *(97.29)*
107.11 *(79.87)*	6941 *(30.87)*	5.79 *(9.31)*	2200	3.27	9th (4H) Gear			200 *(93.1)*	56 *(13.3)*	62 *(16.7)*	28.80 *(97.25)*
108.63 *(81.00)*	6049 *(26.91)*	6.73 *(10.84)*	2199	2.87	10th (5H) Gear			199 *(92.8)*	57 *(13.9)*	64 *(17.8)*	28.80 *(97.25)*
108.44 *(80.86)*	5002 *(22.25)*	8.13 *(13.08)*	2199	2.38	11th (6L) Gear			200 *(93.1)*	58 *(14.4)*	65 *(18.3)*	28.80 *(97.25)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 191°F *(88.1°C)*. Nine gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1515, June 21, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

TIRES, BALLAST AND WEIGHT		Bias Ply Tires **With Ballast**	Bias Ply Tires **Without Ballast**	Radial Ply Tires **With Ballast**	Radial Ply Tires **Without Ballast**
Rear Tires	—No., size, ply & psi *(kPa)*	Four 18.4-38; 8; 18 *(125)*	Four 18.4-38; 8; 18 *(125)*	Four 18.4R38; 8; 18 *(125)*	Four 18.4R38; 8; 18 *(125)*
Ballast	—Liquid (each inner)	572 lb *(260 kg)*	None	468 lb *(212 kg)*	None
	—Cast Iron (each inner)	710 lb *(322 kg)*	None	730 lb *(331 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 11.00-16; 6; 32 *(220)*	Two 11.00-16; 6; 32 *(220)*	Two 11.00-16; 6; 32 *(220)*	Two 11.00-16; 6; 32 *(220)*
Ballast	—Liquid (each)	None	None	None	None
	—Cast Iron (each)	95 lb *(43 kg)*	None	82 lb *(37 kg)*	None
Height of Drawbar		22 in *(560 mm)*	22 in *(560 mm)*	22 in *(560 mm)*	22 in *(560 mm)*
Static Weight with Operator	—Rear	12325 lb *(5591 kg)*	9760 lb *(4427 kg)*	12315 lb *(5586 kg)*	9920 lb *(4500 kg)*
	—Front	3685 lb *(1671 kg)*	3495 lb *(1585 kg)*	3660 lb *(1660 kg)*	3495 lb *(1585 kg)*
	—Total	16010 lb *(7262 kg)*	13255 lb *(6012 kg)*	15975 lb *(7246 kg)*	13415 lb *(6085 kg)*

Ford TW-15 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

LUGGING ABILITY IN 8th (5L) GEAR

Crankshaft Speed rpm	2200	1977	1757	1542	1316	1090
Pull—lbs *(kN)*	7571 *(33.68)*	8654 *(38.49)*	9210 *(40.97)*	9480 *(42.17)*	9237 *(41.08)*	8254 *(36.71)*
Increase in Pull %	0	14	22	25	22	9
Power—Hp *(kW)*	107.00 *(79.79)*	104.79 *(78.14)*	98.44 *(73.41)*	88.73 *(66.17)*	73.92 *(55.12)*	55.71 *(41.54)*
Speed—Mph *(km/h)*	5.30 *(8.53)*	4.54 *(7.31)*	4.01 *(6.45)*	3.51 *(5.65)*	3.00 *(4.83)*	2.53 *(4.07)*
Slip %	6.39	7.07	7.07	7.96	7.07	6.77

TRACTOR SOUND LEVEL WITH CAB	Radial Ply dB(A)	Bias Ply dB(A)
Maximum Available Power—Two Hours	78.5	79.0
75% of Pull at Maximum Power—Ten Hours		79.0
50% of Pull at Maximum Power—Two Hours		79.0
50% of Pull at Reduced Engine Speed—Two Hours		77.0
Bystander in 16th (8H) gear		87.5

concrete surface with brake applied) right 324" *(8.23 m)* left 324" *(8.23 m)* (on concrete surface without brake) right 360" *(9.14 m)* left 360" *(9.14 m)* **Power take-off** 540 rpm at 1875 engine rpm and 1000 rpm at 1918 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

NEBRASKA TRACTOR TEST 1536—FORD TW-15 FWD DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1147 rpm)								
121.25 *(90.42)*	2200	7.635 *(28.891)*	0.439 *(0.267)*	15.89 *(3.130)*	205 *(96.2)*	62 *(16.9)*	75 *(23.9)*	28.81 *(97.29)*
Standard Power Take-off Speed (1000 rpm)—One Hour								
115.58 *(86.19)*	1919	6.817 *(25.805)*	0.411 *(0.250)*	16.95 *(3.340)*	204 *(95.6)*	63 *(17.1)*	75 *(24.1)*	28.83 *(97.35)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
108.97 *(81.26)*	2327	7.346 *(27.808)*	0.470 *(0.286)*	14.83 *(2.922)*	200 *(93.3)*	64 *(17.8)*	77 *(25.0)*	......
0.00 *(0.00)*	2462	2.473 *(9.362)*	......	......	184 *(84.4)*	65 *(18.1)*	76 *(24.2)*	......
56.13 *(41.86)*	2394	4.925 *(18.642)*	0.612 *(0.372)*	11.40 *(2.245)*	190 *(87.8)*	63 *(17.2)*	76 *(24.2)*	......
122.10 *(91.05)*	2200	7.673 *(29.045)*	0.438 *(0.267)*	15.91 *(3.135)*	205 *(96.1)*	64 *(17.8)*	76 *(24.2)*	......
28.40 *(21.17)*	2421	3.647 *(13.806)*	0.896 *(0.545)*	7.79 *(1.534)*	186 *(85.3)*	63 *(17.2)*	74 *(23.1)*	......
83.06 *(61.93)*	2366	6.120 *(23.168)*	0.514 *(0.313)*	13.57 *(2.674)*	196 *(90.6)*	63 *(17.2)*	76 *(24.2)*	......
Av 66.46 Av *(49.55)*	2361	5.364 *(20.305)*	0.563 *(0.343)*	12.39 *(2.440)*	193 *(89.6)*	64 *(17.5)*	75 *(24.1)*	28.84 *(97.38)*

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th (5L) Gear											
105.76 *(78.87)*	7614 *(33.87)*	5.21 *(8.38)*	2200	4.40	7.577 *(28.682)*	0.500 *(0.304)*	13.96 *(2.750)*	203 *(94.7)*	55 *(12.8)*	62 *(16.7)*	29.17 *(98.49)*
75% of Pull at Maximum Power—Ten Hours 8th (5L) Gear											
85.75 *(63.95)*	5690 *(25.31)*	5.65 *(9.09)*	2354	3.06	6.780 *(25.665)*	0.551 *(0.335)*	12.65 *(2.492)*	197 *(91.5)*	66 *(18.6)*	72 *(21.9)*	29.00 *(97.93)*
50% of Pull at Maximum Power—Two Hours 8th (5L) Gear											
58.50 *(43.60)*	3794 *(16.88)*	5.79 *(9.32)*	2383	1.87	5.484 *(20.759)*	0.655 *(0.397)*	10.66 *(2.100)*	194 *(89.7)*	72 *(22.2)*	90 *(32.2)*	28.71 *(96.95)*
50% of Pull at Reduced Engine Speed—Two Hours 11th (6L) Gear											
58.50 *(43.60)*	3795 *(16.87)*	5.79 *(9.32)*	1543	1.91	4.079 *(15.440)*	0.486 *(0.295)*	14.36 *(2.830)*	191 *(88.3)*	73 *(22.5)*	92 *(33.3)*	28.71 *(96.95)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
88.72 *(66.16)*	15939 *(70.90)*	2.09 *(3.36)*	2314	14.80	2nd (1H) Gear	198 *(92.2)*	56 *(13.3)*	60 *(15.6)*	29.09 *(98.23)*
96.27 *(71.80)*	15041 *(66.90)*	2.45 *(3.94)*	2200	12.53	3rd (2L) Gear	200 *(93.1)*	56 *(13.3)*	60 *(15.6)*	29.15 *(98.44)*
103.14 *(76.91)*	11908 *(52.97)*	3.25 *(5.23)*	2200	7.77	4th (3L) Gear	202 *(94.2)*	54 *(12.2)*	63 *(17.2)*	29.20 *(98.60)*
101.55 *(75.73)*	11417 *(50.78)*	3.33 *(5.37)*	2200	7.25	5th (2H) Gear	203 *(95.0)*	54 *(12.2)*	63 *(17.2)*	29.20 *(98.60)*
102.36 *(76.33)*	8951 *(39.81)*	4.29 *(6.90)*	2200	5.26	6th (3H) Gear	203 *(95.0)*	54 *(12.2)*	62 *(16.7)*	29.20 *(98.60)*
105.86 *(78.94)*	8918 *(39.67)*	4.45 *(7.16)*	2198	5.26	7th (4L) Gear	202 *(94.2)*	54 *(12.2)*	62 *(16.7)*	29.21 *(98.64)*
107.35 *(80.05)*	7733 *(34.40)*	5.21 *(8.38)*	2200	4.55	8th (5L) Gear	202 *(94.2)*	53 *(11.7)*	62 *(16.7)*	29.23 *(98.71)*
101.30 *(75.54)*	6527 *(29.03)*	5.82 *(9.37)*	2199	3.30	9th (4H) Gear	203 *(94.7)*	56 *(13.3)*	66 *(18.9)*	29.20 *(98.60)*
103.88 *(77.46)*	5743 *(25.54)*	6.78 *(10.92)*	2200	3.11	10th (5H) Gear	202 *(94.4)*	55 *(12.8)*	64 *(17.8)*	29.20 *(98.60)*
103.96 *(77.51)*	4702 *(21.16)*	8.19 *(13.17)*	2199	2.70	11th (6L) Gear	202 *(94.2)*	55 *(12.8)*	64 *(17.8)*	29.20 *(98.60)*

Department of Agricultural Engineering

Dates of Test: September 10 - 18, 1984

Manufacturer: FORD MOTOR COMPANY, 2500 Maple Road, Troy, Michigan 48084

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.8 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60°F** *(15/15°C)* 0.8377 **Fuel weight** 6.975 lbs/gal *(0.836 kg/l)* **Oil SAE** 30 **API service classification** SE, SF, CC, CD **To motor** 3.980 gal *(15.066 l)* **Drained from motor** 3.600 gal *(13.626 l)* **Transmission and final drive lubricant** Ford 134 fluid **Total time engine was operated** 45.5 hours.

ENGINE: Make Ford Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *U754974* **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** 4.4" × 4.4" *(112 mm × 112 mm)* **Compression ratio** 15.6 to 1 **Displacement** 401 cu in *(6572 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and centrifugal precleaner **Oil filter** one full flow cartridge **Oil cooler** heat exchanger in lower part of radiator for crankcase oil, radiator for hydraulic and transmission oil, **Fuel filter** one paper element and sediment bowl **Muffler** vertical **Cooling medium temperature control** two thermostats and variable speed fan.

CHASSIS: Type front wheel assist with duals **Serial No.** *C713306* **Tread width** rear 60" *(1524 mm)* to 120" *(3048 mm)* front 65.2" *(1656 mm)* to 84.4" *(2144 mm)* **Wheel base** 105" *(2667 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 31.8" *(808 mm)* Vertical distance above roadway 42.8" *(1087 mm)* Horizontal distance from center of rear wheel tread 0.2" *(5 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial-(2) range operator controlled powershift **Advertised speeds mph (km/h)** first 1.9 *(3.0)* second 2.4 *(3.9)* third 2.9 *(4.6)* fourth 3.6 *(5.8)* fifth 3.7 *(5.9)* sixth 4.7 *(7.5)* seventh 4.8 *(7.8)* eighth 5.6 *(9.0)* ninth 6.2 *(10.0)* tenth 7.2 *(11.6)* eleventh 8.7 *(13.9)* twelfth 10.9 *(17.6)* thirteenth 11.1 *(17.9)* fourteenth 14.0 *(22.6)* fifteenth 14.6 *(23.4)* sixteenth 18.7 *(30.1)* reverse 2.0 *(3.2)*, 2.6 *(4.2)*, 6.1 *(9.7)*, 7.8 *(12.5)* **Clutch** single dry disc operated by foot pedal **Brakes** single wet disc hydraulically operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 164" *(4.17 m)* left 164" *(4.17 m)* (on concrete surface without brake) right 182" *(4.62 m)* left 182" *(4.62 m)* **Turning space diameter** (on concrete surface with brake applied) right 346" *(8.79 m)* left 346" *(8.79 m)* (or concrete surface without brake) right 382" *(9.69 m)* left 382" *(9.69 m)* **Power take-off** 540 rpm at 1873 engine rpm and 1000 rpm at 1919 engine rpm **Unladen tractor mass** 12515 lb *(5677 kg)*.

LUGGING ABILITY IN 8th (5L) GEAR

Crankshaft Speed rpm	2200	1977	1750	1545	1318	1095
Pull—lbs *(kN)*	7733 *(34.40)*	8404 *(37.38)*	9006 *(40.06)*	9488 *(42.20)*	9151 *(40.71)*	8338 *(37.09)*
Increase in Pull %	0	9	16	23	18	8
Power—Hp *(kW)*	107.35 *(80.05)*	104.37 *(77.83)*	99.07 *(73.88)*	91.36 *(68.13)*	75.38 *(56.21)*	57.27 *(42.70)*
Speed—Mph *(km/h)*	5.21 *(8.38)*	4.66 *(7.50)*	4.13 *(6.64)*	3.61 *(5.81)*	3.09 *(4.97)*	2.58 *(4.14)*
Slip %	4.55	5.08	5.34	5.65	5.49	4.71

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive Engaged dB(A)	Disengaged dB(A)
Maximum Available Power—Two Hours	79.5	79.0
75% of Pull at Maximum Power—Ten Hours	80.5	
50% of Pull at Maximum Power—Two Hours	80.5	
50% of Pull at Reduced Engine Speed—Two Hours	77.5	
Bystander in 16th (8H) gear		85.5

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th (5L) Gear											
103.15 *(76.92)*	7597 *(33.79)*	5.09 *(8.19)*	2200	6.65	7.513 *(28.438)*	0.508 *(0.309)*	13.73 *(2.705)*	203 *(95.0)*	55 *(12.8)*	64 *(17.9)*	29.21 *(98.62)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
81.33 *(60.64)*	12048 *(53.59)*	2.53 *(4.07)*	2336	14.73	3rd (2L) Gear	195 *(90.8)*	56 *(13.3)*	60 *(15.6)*	29.12 *(98.33)*
104.19 *(77.70)*	7672 *(34.13)*	5.09 *(8.20)*	2190	6.61	8th (5L) Gear	203 *(94.7)*	55 *(12.8)*	63 *(17.2)*	29.20 *(98.60)*

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 18.4-38; 8; 18 *(125)*	Four 18.4-38; 8; 18 *(125)*
Ballast	—Liquid (each)	None	None
	—Test Equip (each)	53 lb *(24 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 14.9-28; 6; 18 *(125)*	Two 14.9-28; 6; 18 *(125)*
Ballast	—Liquid (each)	430 lb *(195 kg)*	None
	—Cast Iron (each)	620 lb *(281 kg)*	None
Height of Drawbar		22 in *(560 mm)*	22 in *(560 mm)*
Static Weight with Operator	—Rear	10310 lb *(4677 kg)*	10100 lb *(4581 kg)*
	—Front	6370 lb *(2889 kg)*	4270 lb *(1937 kg)*
	—Total	16680 lb *(7566 kg)*	14370 lb *(6518 kg)*

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi *(kPa)*	2575	*17750*	
Location	remote		
Hydraulic oil temperature °F (°C)	152	*67*	
Location	sump		
	Maximum Lift Capacity		Lift Capacity for Transport
QUICK ATTACH	no		
CATEGORY	II		*not measured
LOAD lbs *(kg)*	7150	*3243*	
TIME sec	2.25		
HITCH POINT MOVEMENT in *(mm)*			
Lowest position	8.0	*203*	
Top of timed range	32.1	*816*	
Highest position	36.0	*914*	
LOAD CG MOVEMENT in *(mm)*			
Lowest position	8.3	*211*	
Top of timed range	31.9	*810*	
Highest position	36.4	*926*	

*Implement load capacity for transport purposes not specified by manufacturer.

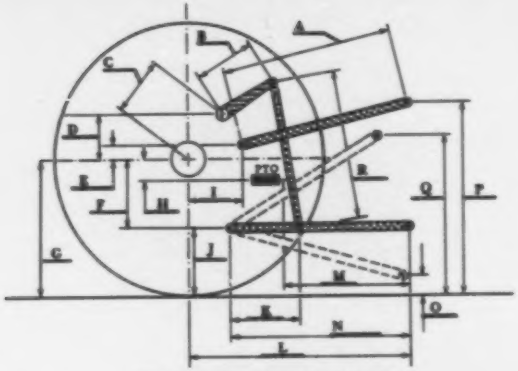
REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 201°F *(93.9°C)*. Ten gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1536, November 16,1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Hitch Dimensions as Tested — No Load

	inch	mm
A	29.5	*743*
B	15.0	*381*
C	16.2	*412*
D	15.5	*394*
E	8.0	*203*
F	10.5	*267*
G	33.0	*838*
H	2.4	*62*
I	17.0	*432*
J	22.5	*572*
K	18.9	*481*
L	45.3	*1150*
M	23.6	*600*
N	36.3	*921*
O	8.0	*203*
P	41.5	*1054*
Q	37.1	*943*
R	32.5	*826*

Ford TW-15 Diesel

The Agricultural Experiment Station
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NEBRASKA TRACTOR TEST 1516—FORD TW-25 DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1167 rpm)								
140.80 (104.99)	2200	8.973 (33.965)	0.446 (0.271)	15.69 (3.090)	202 (94.4)	64 (17.8)	75 (24.1)	28.82 (96.65)
Standard Power Take-off Speed (1000 rpm)—One Hour								
135.70 (101.19)	1918	8.147 (30.837)	0.420 (0.255)	16.66 (3.281)	199 (92.8)	64 (18.0)	74 (23.4)	28.80 (96.39)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
126.84 (94.58)	2330	8.570 (32.440)	0.473 (0.288)	14.79 (2.913)	200 (93.3)	65 (18.6)	77 (24.7)	—
0.00 (0.00)	2400	2.000 ([illegible])	—	—	185 (85.0)	65 (18.3)	75 (23.6)	—
65.34 (48.72)	2404	5.307 (20.089)	0.590 (0.359)	11.86 (2.337)	186 (85.6)	65 (18.1)	75 (23.6)	—
141.27 (105.35)	2200	8.990 (34.030)	0.445 (0.271)	15.70 (3.093)	201 (93.6)	65 (18.3)	75 (23.9)	—
32.86 (24.50)	2420	4.040 (15.293)	0.860 (0.523)	8.13 (1.602)	183 (83.9)	65 (18.3)	74 (23.3)	—
96.55 (71.99)	2360	7.051 (26.689)	0.511 (0.311)	13.69 (2.697)	191 (88.1)	65 (18.6)	75 (23.9)	—
Av 77.14 (57.52)	2364	6.132 (23.212)	0.556 (0.338)	12.58 (2.478)	190 (88.0)	65 (18.6)	75 (23.8)	28.59 (96.54)

DRAWBAR PERFORMANCE WITH BIAS PLY TIRES

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th (5L) Gear											
124.84 (93.09)	8807 (39.18)	5.35 (8.61)	2199	6.00	8.880 (34.613)	0.525 (0.319)	13.20 (2.600)	200 (93.3)	40 (4.4)	50 (10.0)	29.09 (98.23)
75% of Pull at Maximum Power—Two Hours 8th (5L) Gear											
103.35 (77.07)	6704 (30.16)	5.71 (9.19)	2344	4.29	7.994 (30.262)	0.557 (0.339)	12.92 (2.546)	198 (92.2)	47 (8.4)	58 (14.5)	29.08 (98.20)
50% of Pull at Maximum Power—Two Hours 8th (5L) Gear											
71.22 (53.11)	4525 (20.13)	5.90 (9.50)	2300	2.70	6.960 (26.345)	0.655 (0.398)	11.20 (2.205)	192 (88.9)	48 (8.9)	60 (15.6)	29.04 (98.06)
50% of Pull at Reduced Engine Speed—Two Hours 10th (6L) Gear											
71.28 (53.15)	4525 (20.13)	5.91 (9.51)	1546	2.80	4.732 (17.912)	0.464 (0.282)	15.06 (2.967)	191 (88.3)	48 (8.6)	58 (14.4)	29.04 (98.06)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
102.90 (76.73)	14871 (66.15)	2.60 (4.18)	2236	14.97	3rd (2L) Gear	198 (91.9)	48 (8.9)	55 (12.8)	29.10 (98.27)
118.27 (88.20)	13895 (61.81)	3.19 (5.14)	2299	11.96	4th (3L) Gear	201 (93.9)	48 (8.9)	55 (12.8)	29.10 (98.27)
118.29 (88.21)	13516 (60.12)	3.28 (5.28)	2301	11.34	5th (2H) Gear	202 (94.2)	48 (8.9)	55 (12.8)	29.10 (98.27)
122.55 (91.38)	10688 (47.54)	4.29 (6.91)	2200	7.88	6th (3H) Gear	203 (95.0)	48 (8.9)	56 (13.3)	29.10 (98.27)
124.02 (92.48)	10455 (46.50)	4.47 (7.19)	2201	7.50	7th (4L) Gear	204 (95.3)	48 (8.9)	56 (13.3)	29.11 (98.30)
126.73 (94.50)	9045 (40.23)	5.25 (8.46)	2199	6.06	8th (5L) Gear	204 (95.3)	48 (8.9)	59 (15.0)	29.09 (98.23)
124.95 (93.18)	7970 (35.45)	5.88 (9.46)	2199	5.42	9th (4H) Gear	203 (95.0)	48 (8.9)	56 (13.3)	29.11 (98.30)
125.75 (93.77)	6860 (30.51)	6.88 (11.06)	2190	4.50	10th (5H) Gear	205 (96.2)	48 (8.9)	57 (13.9)	29.11 (98.30)
125.73 (93.76)	5660 (25.17)	8.33 (13.41)	2190	3.46	11th (6L) Gear	203 (94.7)	48 (8.9)	57 (13.9)	29.11 (98.30)

Department of Agricultural Engineering

Dates of Test: April 25 to May 15, 1984

Manufacturer: FORD MOTOR COMPANY, 2500 Maple Road, Troy, Michigan 48084

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8401 **Fuel weight** 6.995 lbs/gal *(0.838 kg/l)* **Oil** SAE 30 **API service classification** SE, SF, CC, CD **To motor** 4.579 gal *(17.333 l)* **Drained from motor** 3.999 gal *(15.139 l)* **Transmission and final drive lubricant** Ford 134 fluid **Total time engine was operated** 41.0 hours.

ENGINE: **Make** Ford Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *H729443* **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** 4.4" × 4.4" *(112 mm × 112 mm)* **Compression ratio** 15.6 to 1 **Displacement** 401 cu in *(6572 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** one full flow cartridge **Oil cooler** heat exchanger in lower part of radiator for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element and sediment bowl **Muffler** vertical **Cooling medium temperature control** two thermostats and variable speed fan.

CHASSIS: **Type** standard with duals **Serial No.** *C713507* **Tread width** rear 64" *(1626 mm)* to 120" *(3048 mm)* front 63" *(1600 mm)* to 87" *(2210 mm)* **Wheel base** 109.7" *(2786 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 32.5" *(825 mm)* Vertical distance above roadway 44.6" *(1133 mm)* Horizontal distance from center of rear wheel tread 0.4" *(10 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph** *(km/h)* first 1.8 *(2.9)* second 2.3 *(3.7)* third 2.8 *(4.5)* fourth 3.5 *(5.6)* fifth 3.6 *(5.7)* sixth 4.5 *(7.2)* seventh 4.7 *(7.5)* eighth 5.4 *(8.7)* ninth 6.0 *(9.6)* tenth 7.0 *(11.2)* eleventh 8.4 *(13.4)* twelfth 10.5 *(16.9)* thirteenth 10.7 *(17.3)* fourteenth 13.5 *(21.8)* fifteenth 14.0 *(22.6)* sixteenth 18.0 *(29.0)* reverse 1.9 *(3.1)*, 2.5 *(4.0)*, 5.8 *(9.4)*, 7.5 *(12.1)* **Clutch** single dry disc operated by foot pedal **Brakes** single wet disc hydraulically operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 159.0" *(4.05 m)* left 159.0" *(4.05 m)* (on concrete surface without brake) right 174" *(4.42 m)* left 174" *(4.42 m)* **Turning space diameter** (on

DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th (5L) Gear											
126.01 (94.11)	8730 (38.83)	5.44 (8.76)	2200	5.17	8.900 (33.694)	0.494 (0.301)	14.16 (2.789)	207 (96.9)	60 (15.3)	72 (21.9)	28.17 (95.11)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
107.77 (80.37)	15614 (69.45)	2.59 (4.17)	2236	14.08	3rd (2L) Gear	198 (92.2)	56 (13.3)	64 (17.8)	29.24 (98.74)
124.09 (92.53)	13757 (61.19)	3.4x (5.48)	2197	8.14	4th (3L) Gear	203 (94.7)	56 (13.3)	65 (18.3)	29.23 (98.71)
129.16 (96.32)	13318 (59.24)	3.50 (5.63)	2200	5.93	5th (2H) Gear	204 (95.3)	56 (13.3)	66 (18.9)	29.23 (98.71)
128.08 (95.51)	10447 (46.47)	4.49 (7.23)	2199	3.96	6th (3H) Gear	205 (95.8)	56 (13.3)	66 (18.9)	29.22 (98.67)
127.51 (95.08)	10245 (45.57)	4.67 (7.51)	2200	3.60	7th (4L) Gear	207 (96.9)	56 (13.3)	67 (19.4)	29.21 (98.64)
128.81 (96.06)	8885 (39.51)	5.44 (8.75)	2198	3.19	8th (5L) Gear	206 (96.4)	58 (14.4)	70 (21.1)	29.20 (98.60)
129.25 (96.38)	7810 (34.73)	6.08 (9.78)	2200	2.71	9th (4H) Gear	206 (96.4)	56 (13.3)	68 (20.0)	29.21 (98.64)
127.49 (95.07)	6774 (30.13)	7.06 (11.36)	2200	2.58	10th (5H) Gear	205 (96.1)	56 (13.3)	68 (20.0)	29.20 (98.60)
126.59 (94.40)	5574 (24.79)	8.51 (13.70)	2201	2.62	11th (6L) Gear	206 (96.4)	57 (13.9)	68 (20.0)	29.20 (98.60)

TIRES, BALLAST AND WEIGHT		Bias Ply Tires With Ballast	Bias Ply Tires Without Ballast	Radial Ply Tires With Ballast	Radial Ply Tires Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Four 20.8-38; 10; 16 *(110)*	Four 20.8-38; 10; 16 *(110)*	Four 20.8R38; 10; 16 *(110)*	Four 20.8R38; 10; 16 *(110)*
Ballast	—Liquid (each tire)	888 lb *(403 kg)*	None	672 lb *(305 kg)*	None
	—Cast iron (each tire)	305 lb *(138 kg)*	None	None	None
Front Tires	—No., size, ply & psi (kPa)	Two 14L-16.1SL; 8; 36 *(250)*	Two 14L-16.1SL; 8; 36 *(250)*	Two 14L-16.1SL; 8; 36 *(250)*	Two 14L-16.1SL; 8; 36 *(250)*
Ballast	—Liquid (total)	None	None	None	None
	—Cast iron (total)	72 lb *(33 kg)*	None	65 lb *(29 kg)*	None
Height of Drawbar		21 in *(533 mm)*	21 in *(533 mm)*	21 in *(533 mm)*	21 in *(533 mm)*
Static Weight with Operator	—Rear	13300 lb *(6033 kg)*	10915 lb *(4951 kg)*	12430 lb *(5634 kg)*	11075 lb *(5024 kg)*
	—Front	4665 lb *(2116 kg)*	4520 lb *(2050 kg)*	4650 lb *(2109 kg)*	4520 lb *(2050 kg)*
	—Total	17965 lb *(8149 kg)*	15435 lb *(7001 kg)*	17070 lb *(7743 kg)*	15595 lb *(7074 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 185°F *(83.9°C)*. Nine gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1516, June 21, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Ford TW-25 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

LUGGING ABILITY IN 8th (5L) GEAR

Crankshaft Speed rpm	2199	1981	1754	1544	1308	1096
Pull—lbs *(kN)*	9045 *(40.23)*	9699 *(43.47)*	10343 *(46.36)*	10239 *(45.55)*	9819 *(44.01)*	8489 *(38.05)*
Increase in Pull %	0	7	14	13	9	−6
Power—Hp *(kW)*	126.73 *(94.50)*	121.64 *(90.71)*	114.12 *(85.10)*	99.52 *(74.21)*	81.15 *(60.51)*	59.46 *(44.34)*
Speed—Mph *(km/h)*	5.25 *(8.46)*	4.70 *(7.57)*	4.14 *(6.66)*	3.64 *(5.87)*	3.10 *(4.99)*	2.63 *(4.23)*
Slip %	6.06	6.84	7.45	7.30	6.99	6.06

TRACTOR SOUND LEVEL WITH CAB	Radial Ply dB(A)	Bias Ply dB(A)
Maximum Available Power—Two Hours	80.0	81.0
75% of Pull at Maximum Power—Ten Hours		82.5
50% of Pull at Maximum Power—Two Hours		82.5
50% of Pull at Reduced Engine Speed—Two Hours		78.5
Bystander in 10th (8H) gear		89.5

concrete surface with brake applied) right 324" *(8.23 m)* left 324" *(8.23 m)* (on concrete surface without brake) right 360" *(9.14 m)* left 360" *(9.14 m)* **Power take-off** 540 rpm at 1875 engine rpm and 1000 rpm at 1918 engine rpm.

REPAIRS and ADJUSTMENTS: During preliminary PTO tests, the missing foam rubber seal strip on the right side of the radiator was installed.

NEBRASKA TRACTOR TEST 1517—FORD TW-35 DIESEL 16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1147 rpm)								
170.50 *(127.14)*	2200	10.335 *(39.119)*	0.425 *(0.258)*	16.48 *(3.246)*	191 *(88.3)*	55 *(12.8)*	75 *(23.9)*	28.59 *(96.54)*
Standard Power Take-off Speed (1000 rpm)—One Hour								
166.67 *(124.28)*	1919	9.575 *(36.245)*	0.402 *(0.244)*	17.41 *(3.429)*	190 *(87.8)*	56 *(13.3)*	75 *(23.7)*	28.66 *(96.78)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
148.39 *(110.65)*	2255	9.247 *(35.001)*	0.436 *(0.265)*	16.05 *(3.161)*	186 *(85.6)*	58 *(14.2)*	75 *(23.9)*	....
0.00 *(0.00)*	2388	2.560 *(9.692)*	....	....	181 *(82.8)*	57 *(13.6)*	74 *(23.1)*	....
76.66 *(57.17)*	2331	5.854 *(22.160)*	0.534 *(0.325)*	13.10 *(2.580)*	184 *(84.2)*	56 *(13.3)*	74 *(23.1)*	....
170.72 *(127.31)*	2200	10.357 *(39.206)*	0.424 *(0.258)*	16.48 *(3.247)*	191 *(88.3)*	58 *(14.4)*	76 *(24.2)*	....
38.79 *(28.92)*	2357	4.194 *(15.877)*	0.756 *(0.460)*	9.25 *(1.822)*	182 *(83.3)*	58 *(14.4)*	76 *(24.2)*	....
112.80 *(84.11)*	2296	7.420 *(28.118)*	0.461 *(0.280)*	15.18 *(2.990)*	185 *(85.0)*	58 *(14.4)*	74 *(23.3)*	....
Av 91.23 *Av (68.03)*	2303	6.607 *(25.009)*	0.507 *(0.308)*	13.81 *(2.720)*	185 *(85.0)*	57 *(13.9)*	75 *(23.4)*	28.70 *(96.92)*

DRAWBAR PERFORMANCE WITH BIAS PLY TIRES

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th (5L) Gear											
145.43 *(108.45)*	10258 *(45.63)*	5.32 *(8.56)*	2198	6.15	10.164 *(38.476)*	0.489 *(0.297)*	14.31 *(2.819)*	193 *(89.2)*	52 *(11.1)*	57 *(13.6)*	28.61 *(96.59)*
75% of Pull at Maximum Power—Ten Hours 8th (5L) Gear											
115.86 *(86.39)*	7853 *(34.93)*	5.55 *(8.93)*	2260	4.68	8.332 *(31.539)*	0.503 *(0.306)*	13.91 *(2.739)*	191 *(88.4)*	53 *(11.9)*	58 *(14.5)*	28.63 *(96.67)*
50% of Pull at Maximum Power—Two Hours 8th (5L) Gear											
80.26 *(59.85)*	5223 *(23.23)*	5.76 *(9.27)*	2313	3.96	6.580 *(24.907)*	0.574 *(0.349)*	12.16 *(2.396)*	191 *(88.3)*	51 *(10.6)*	53 *(11.7)*	28.95 *(97.74)*
50% of Pull at Reduced Engine Speed—Two Hours 11th (6L) Gear											
80.26 *(59.85)*	5221 *(23.22)*	5.77 *(9.28)*	1486	3.07	5.504 *(20.835)*	0.480 *(0.292)*	14.58 *(2.873)*	191 *(88.3)*	52 *(11.1)*	55 *(12.8)*	28.89 *(97.56)*
MAXIMUM POWER IN SELECTED GEARS											
115.93 *(86.45)*	17054 *(75.86)*	2.55 *(4.10)*	2262	14.82		3rd (2L) Gear		192 *(88.9)*	39 *(3.9)*	42 *(5.6)*	29.05 *(98.10)*
138.16 *(103.03)*	16226 *(72.18)*	3.19 *(5.14)*	2200	12.84		4th (3L) Gear		192 *(88.9)*	41 *(5.0)*	44 *(6.7)*	29.05 *(98.10)*
138.73 *(103.45)*	15805 *(70.30)*	3.29 *(5.30)*	2200	12.99		5th (2H) Gear		191 *(88.3)*	43 *(6.1)*	46 *(7.8)*	29.05 *(98.10)*
143.93 *(107.33)*	12503 *(55.61)*	4.32 *(6.95)*	2199	8.29		6th (3H) Gear		195 *(90.5)*	45 *(7.2)*	48 *(8.9)*	29.04 *(98.06)*
143.16 *(106.75)*	11904 *(52.95)*	4.51 *(7.26)*	2198	7.69		7th (4L) Gear		194 *(90.0)*	47 *(8.3)*	52 *(11.1)*	29.04 *(98.06)*
147.49 *(109.98)*	10444 *(46.46)*	5.30 *(8.52)*	2198	6.02		8th (5L) Gear		193 *(89.5)*	50 *(10.0)*	55 *(12.8)*	29.01 *(97.96)*
143.44 *(106.96)*	9065 *(40.32)*	5.93 *(9.55)*	2200	5.60		9th (4H) Gear		194 *(90.0)*	48 *(8.9)*	53 *(11.7)*	29.04 *(98.06)*
145.82 *(108.74)*	7878 *(35.04)*	6.94 *(11.17)*	2200	4.96		10th (5H) Gear		192 *(88.9)*	48 *(8.9)*	54 *(12.2)*	29.03 *(98.03)*
145.80 *(108.73)*	6499 *(28.91)*	8.41 *(13.54)*	2200	3.74		11th (6L) Gear		192 *(88.9)*	49 *(9.4)*	55 *(12.8)*	29.02 *(98.00)*

Department of Agricultural Engineering

Dates of Test: April 26 to May 8, 1984

Manufacturer: FORD MOTOR COMPANY, 2500 Maple Road, Troy, Michigan 48084

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8401 **Fuel weight** 6.995 lbs/gal *(0.838 kg/l)* **Oil SAE** 30 **API service classification** SE, SF, CC, CD **To motor** 4.307 gal *(16.304 l)* **Drained from motor** 3.653 gal *(13.829 l)* **Transmission and final drive lubricant** Ford 134 fluid **Total time engine was operated** 45.0 hours.

ENGINE: Make Ford Diesel **Type** six cylinder vertical with turbocharger and air to air intercooler **Serial No.** *M726721* **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** 4.4" x 4.4" *(112 mm x 112 mm)* **Compression ratio** 15.6 to 1 **Displacement** 401 cu in *(6572 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** two full flow cartridges **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element and sediment bowl **Muffler** vertical **Cooling medium temperature control** two thermostats and variable speed fan.

CHASSIS: Type standard with duals **Serial No.** *C713308* **Tread width** rear 64" *(1626 mm)* to 120" *(3048 mm)* front 63" *(1600 mm)* to 87" *(2210 mm)* **Wheel base** 110.5" *(2806 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 31.9" *(810 mm)* Vertical distance above roadway 43.6" *(1107 mm)* Horizontal distance from center of rear wheel tread 0.2" *(5 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph (km/h)** first 1.8 *(2.9)* second 2.4 *(3.8)* third 2.8 *(4.5)* fourth 3.5 *(5.7)* fifth 3.6 *(5.8)* sixth 4.6 *(7.4)* seventh 4.7 *(7.6)* eighth 5.5 *(8.8)* ninth 6.1 *(9.8)* tenth 7.1 *(11.4)* eleventh 8.5 *(13.7)* twelfth 10.7 *(17.2)* thirteenth 10.9 *(17.5)* fourteenth 13.7 *(22.1)* fifteenth 14.3 *(22.9)* sixteenth 18.3 *(29.5)* reverse 2.0 *(3.2)*, 2.5 *(4.1)*, 5.9 *(9.5)*, 7.6 *(12.3)* **Clutch** single dry disc operated by foot pedal **Brakes** power assisted, double wet disc operated hydraulically by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 159.6" *(4.05 m)* left 159.6" *(4.05 m)* (on concrete surface without brake) right 174" *(4.42 m)* left 174" *(4.42 m)* **Turning space diameter** (on concrete surface with brake applied) right 324" *(8.23 m)* left 324" *(8.23 m)* (on concrete surface without brake) right 360" *(9.14 m)* left 360" *(9.14 m)* **Power take-off** 1000 rpm at 1919 engine rpm.

LUGGING ABILITY IN 8th (5L) GEAR

Crankshaft-Speed rpm	2199	1975	1761	1541	1312	1091
Pull—lbs *(kN)*	10444 *(46.46)*	11589 *(51.55)*	12168 *(54.34)*	12035 *(53.94)*	11217 *(50.28)*	9283 *(41.61)*
Increase in Pull %	0	9	17	15	7	-11
Power—Hp *(kW)*	147.49 *(109.98)*	143.70 *(107.16)*	135.67 *(101.17)*	117.50 *(87.62)*	93.87 *(70.00)*	65.53 *(48.86)*
Speed—Mph *(km/h)*	5.30 *(8.52)*	4.73 *(7.61)*	4.18 *(6.73)*	3.66 *(5.89)*	3.14 *(5.05)*	2.65 *(4.26)*
Slip %	6.62	7.2[illegible]	7.84	7.69	7.23	5.99

TRACTOR SOUND LEVEL WITH CAB	Radial Ply dB(A)	Bias Ply dB(A)
Maximum Available Power—Two Hours	81.5	82.5
75% of Pull at Maximum Power—Ten Hours		81.0
50% of Pull at Maximum Power—Two Hours		81.0
50% of Pull at Reduced Engine Speed—Two Hours		80.0
Bystander in 16th (8H) gear		91.5

DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th (5L) Gear											
151.54 *(113.00)*	10241 *(45.55)*	5.55 *(8.93)*	2200	2.62	10.100 *(38.233)*	0.466 *(0.284)*	15.00 *(2.956)*	195 *(90.3)*	44 *(6.7)*	48 *(8.9)*	29.07 *(98.15)*
MAXIMUM POWER IN SELECTED GEARS											
137.32 *(102.40)*	18615 *(82.80)*	2.77 *(4.45)*	2240	7.11		3rd (2L) Gear		193 *(89.2)*	47 *(8.3)*	50 *(10.0)*	28.95 *(97.76)*
149.31 *(111.34)*	15945 *(70.93)*	3.51 *(5.65)*	2200	4.57		4th (3L) Gear		191 *(88.3)*	47 *(8.3)*	50 *(10.0)*	28.96 *(97.79)*
149.03 *(111.13)*	15535 *(69.10)*	3.60 *(5.79)*	2199	4.49		5th (2H) Gear		192 *(88.6)*	47 *(8.3)*	50 *(10.0)*	28.97 *(97.83)*
149.64 *(111.59)*	12237 *(54.43)*	4.59 *(7.38)*	2200	3.25		6th (3H) Gear		194 *(90.0)*	46 *(7.8)*	49 *(9.4)*	28.98 *(97.86)*
152.09 *(113.41)*	11970 *(53.24)*	4.76 *(7.67)*	2200	3.17		7th (4L) Gear		194 *(89.7)*	46 *(7.8)*	49 *(9.4)*	28.99 *(97.89)*
154.40 *(115.14)*	10443 *(46.45)*	5.54 *(8.92)*	2199	2.66		8th (5L) Gear		196 *(90.8)*	46 *(7.8)*	48 *(8.9)*	29.00 *(97.93)*
151.06 *(112.65)*	9182 *(40.84)*	6.17 *(9.93)*	2199	2.40		9th (4H) Gear		194 *(89.7)*	46 *(7.8)*	49 *(9.4)*	29.00 *(97.93)*
150.52 *(112.24)*	7867 *(34.99)*	7.18 *(11.55)*	2200	1.98		10th (5H) Gear		192 *(88.6)*	46 *(7.8)*	48 *(8.9)*	29.00 *(97.93)*
151.41 *(112.91)*	6566 *(29.21)*	8.65 *(13.92)*	2199	1.80		11th (6L) Gear		194 *(89.7)*	45 *(7.2)*	48 *(8.9)*	29.00 *(97.93)*

TIRES, BALLAST AND WEIGHT		Bias Ply Tires With Ballast	Bias Ply Tires Without Ballast	Radial Ply Tires With Ballast	Radial Ply Tires Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 20.8-38; 10; 16 *(110)*	Four 20.8-38; 10; 16 *(110)*	Four 20.8R38; 10; 16 *(110)*	Four 20.8R38; 10; 16 *(110)*
Ballast	—Liquid (each inner)	1415 lb *(642 kg)*	None	1305 lb *(592 kg)*	None
	—Cast Iron (each inner)	570 lb *(259 kg)*	None	600 lb *(272 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 14L-16.1SL; 8; 36 *(250)*	Two 14L-16.1SL; 8; 36 *(250)*	Two 14L-16.1SL; 8; 36 *(250)*	Two 14L-16.1SL; 8; 36 *(250)*
Ballast	—Liquid (each)	None	None	None	None
	—Cast Iron (each)	60 lb *(27 kg)*	None	65 lb *(29 kg)*	None
Height of Drawbar		24.5 in *(620 mm)*	24.5 in *(620 mm)*	22.5 in *(570 mm)*	22.5 in *(570 mm)*
Static Weight with Operator	—Rear	15540 lb *(7049 kg)*	11570 lb *(5248 kg)*	15540 lb *(7049 kg)*	11730 lb *(5321 kg)*
	—Front	4730 lb *(2145 kg)*	4610 lb *(2091 kg)*	4740 lb *(2150 kg)*	4610 lb *(2091 kg)*
	—Total	20270 lb *(9194 kg)*	16180 lb *(7339 kg)*	20280 lb *(9199 kg)*	16340 lb *(7412 kg)*

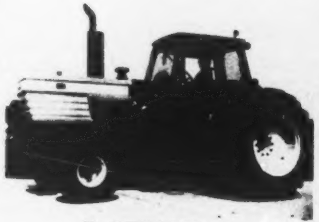
REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 174°F *(78.9°C)*. Nine gears were chosen between stability limit and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1517**, July 12, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Ford TW-35 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1537—FORD TW-35 FWD DIESEL 16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1147 rpm)								
171.12 *(127.60)*	2200	10.166 *(38.479)*	0.414 *(0.252)*	16.83 *(3.316)*	198 *(92.4)*	64 *(17.7)*	75 *(24.1)*	29.13 *(98.38)*
Standard Power Take-off Speed (1000 rpm)—One Hour								
162.55 *(121.21)*	1919	9.249 *(35.007)*	0.397 *(0.241)*	17.58 *(3.463)*	192 *(88.7)*	65 *(18.2)*	76 *(24.4)*	29.13 *(98.35)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
154.07 *(114.89)*	2330	9.521 *(36.041)*	0.431 *(0.262)*	16.18 *(3.188)*	197 *(91.7)*	66 *(18.9)*	77 *(24.7)*	....
0.00 *(0.00)*	2455	2.481 *(9.393)*	....	....	175 *(79.4)*	66 *(18.9)*	77 *(25.0)*	....
79.10 *(58.98)*	2392	5.883 *(22.269)*	0.519 *(0.316)*	13.44 *(2.649)*	182 *(83.3)*	67 *(19.2)*	77 *(25.0)*	....
170.93 *(127.46)*	2201	10.171 *(38.499)*	0.415 *(0.252)*	16.81 *(3.311)*	200 *(93.3)*	67 *(19.2)*	78 *(25.6)*	....
40.06 *(29.87)*	2423	4.133 *(15.644)*	0.720 *(0.438)*	9.69 *(1.909)*	182 *(83.3)*	67 *(19.4)*	78 *(25.3)*	....
116.96 *(87.22)*	2358	7.629 *(28.878)*	0.455 *(0.277)*	15.33 *(3.020)*	187 *(86.1)*	67 *(19.4)*	77 *(25.0)*	....
Av 93.52 *Av* *(69.74)*	2360	6.636 *(25.121)*	0.495 *(0.301)*	14.09 *(2.776)*	187 *(86.2)*	67 *(19.2)*	77 *(25.1)*	29.09 *(98.23)*

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 8th (5L) Gear											
145.69 *(108.64)*	10041 *(44.66)*	5.44 *(8.76)*	2199	4.96	10.106 *(38.256)*	0.484 *(0.294)*	14.42 *(2.840)*	201 *(93.6)*	60 *(15.3)*	70 *(20.8)*	28.85 *(97.42)*
75% of Pull at Maximum Power—Ten Hours 8th (5L) Gear											
119.30 *(88.96)*	7625 *(33.92)*	5.87 *(9.44)*	2337	3.59	8.698 *(32.927)*	0.509 *(0.309)*	13.71 *(2.702)*	198 *(92.4)*	63 *(17.2)*	75 *(24.1)*	28.65 *(96.76)*
50% of Pull at Maximum Power—Two Hours 8th (5L) Gear											
81.06 *(60.45)*	5048 *(22.45)*	6.02 *(9.69)*	2368	2.33	6.730 *(25.477)*	0.579 *(0.352)*	12.04 *(2.373)*	190 *(87.8)*	66 *(18.9)*	83 *(28.1)*	28.99 *(97.88)*
50% of Pull at Reduced Engine Speed—Two Hours 11th (6L) Gear											
81.05 *(60.44)*	5048 *(22.45)*	6.02 *(9.69)*	1551	2.24	5.605 *(21.217)*	0.482 *(0.293)*	14.46 *(2.849)*	192 *(88.9)*	69 *(20.3)*	91 *(32.5)*	28.95 *(97.76)*
MAXIMUM POWER IN SELECTED GEARS											
131.17 *(97.81)*	18823 *(83.73)*	2.61 *(4.21)*	2294	14.78	3rd (2L) Gear			196 *(91.1)*	57 *(13.9)*	64 *(17.8)*	28.81 *(97.29)*
138.87 *(103.55)*	15400 *(68.50)*	3.38 *(5.44)*	2199	8.55	4th (3L) Gear			199 *(92.5)*	59 *(15.0)*	65 *(18.3)*	29.00 *(97.93)*
138.38 *(103.19)*	14968 *(66.58)*	3.47 *(5.58)*	2199	8.25	5th (2H) Gear			199 *(92.5)*	60 *(15.6)*	66 *(18.9)*	29.00 *(97.93)*
141.60 *(105.59)*	11885 *(52.86)*	4.47 *(7.19)*	2198	6.00	6th (3H) Gear			200 *(93.1)*	60 *(15.6)*	67 *(19.4)*	29.00 *(97.93)*
144.30 *(107.60)*	11638 *(51.77)*	4.65 *(7.48)*	2200	5.92	7th (4L) Gear			199 *(92.5)*	61 *(16.1)*	69 *(20.6)*	29.00 *(97.93)*
147.55 *(110.02)*	10166 *(45.22)*	5.44 *(8.76)*	2199	5.04	8th (5L) Gear			201 *(93.9)*	60 *(15.6)*	70 *(21.1)*	28.85 *(97.42)*
142.14 *(105.99)*	8759 *(38.96)*	6.09 *(9.79)*	2200	4.22	9th (4H) Gear			199 *(92.5)*	62 *(16.7)*	70 *(21.1)*	29.00 *(97.93)*
144.01 *(107.39)*	7609 *(33.84)*	7.10 *(11.42)*	2199	3.64	10th (5H) Gear			198 *(91.9)*	62 *(16.7)*	72 *(22.2)*	29.00 *(97.93)*
143.70 *(107.15)*	6278 *(27.93)*	8.58 *(13.81)*	2199	2.88	11th (6L) Gear			200 *(93.1)*	62 *(16.7)*	74 *(23.3)*	29.00 *(97.93)*

Department of Agricultural Engineering

Dates of Test: September 12 - 24, 1984

Manufacturer: FORD MOTOR COMPANY, 2500 Maple Road, Troy, Michigan 48084

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.8 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60°F** *(15/15°C)* 0.8378 **Fuel weight** 6.976 lbs/gal *(0.836 kg/l)* **Oil SAE** 30 **API service classification** SE, SF, CC, CD **To motor** 4.063 gal *(15.379 l)* **Drained from motor** 3.700 gal *(14.007 l)* **Transmission and final drive lubricant** Ford 134 fluid **Total time engine was operated** 38.0 hours.

ENGINE: **Make** Ford Diesel **Type** six cylinder vertical with turbocharger and air to air intercooler **Serial No.** *M766277* **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** 4.4" × 4.4" *(112 mm × 112 mm)* **Compression ratio** 15.6 to 1 **Displacement** 401 cu in *(6572 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** two full flow cartridges **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element and sediment bowl **Muffler** vertical **Cooling medium temperature control** two thermostats and variable speed fan.

CHASSIS: **Type** front wheel assist with duals **Serial No.** *C724968* **Tread width** rear 64" *(1626 mm)* to 120" *(3048 mm)* front 70" *(1778 mm)* to 84" *(2134 mm)* **Wheel base** 111" *(2819 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 35.8" *(910 mm)* Vertical distance above roadway 43.6" *(1107 mm)* Horizontal distance from center of rear wheel tread 0.2" *(5 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph** *(km/h)* first 1.8 *(2.9)* second 2.4 *(3.8)* third 2.8 *(4.5)* fourth 3.5 *(5.7)* fifth 3.6 *(5.8)* sixth 4.6 *(7.4)* seventh 4.7 *(7.6)* eighth 5.5 *(8.8)* ninth 6.1 *(9.8)* tenth 7.1 *(11.4)* eleventh 8.5 *(13.7)* twelfth 10.7 *(17.2)* thirteenth 10.9 *(17.5)* fourteenth 13.7 *(22.1)* fifteenth 14.3 *(22.9)* sixteenth 18.3 *(29.5)* reverse 2.0 *(3.2)*, 2.5 *(4.1)*, 5.9 *(9.5)*, 7.6 *(12.3)* **Clutch** single dry disc operated by foot pedal **Brakes** power assisted, double wet disc hydraulically operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 198" *(5.03 m)* left 198" *(5.03 m)* (on concrete surface without brake) right 227" *(5.77 m)* left 227" *(5.77 m)* **Turning space diameter** (on concrete surface with brake applied) right 414" *(10.51 m)* left 414" *(10.51 m)* (on concrete surface without brake) right 472" *(12.00 m)* left 472" *(12.00 m)* **Power take-off** 1000 rpm at 1919 engine rpm **Unladen tractor mass** 15100 lb *(6849 kg)*.

LUGGING ABILITY IN 8th (5L) GEAR

Crankshaft Speed rpm	2199	1984	1754	1538	1315	1092
Pull—lbs *(kN)*	10166 *(45.22)*	10870 *(48.35)*	11555 *(51.40)*	11607 *(51.63)*	10608 *(47.19)*	9131 *(40.62)*
Increase in Pull %	0	7	14	14	4	−10
Power—Hp *(kW)*	147.55 *(110.02)*	141.54 *(105.55)*	132.51 *(98.81)*	116.59 *(86.94)*	91.76 *(68.42)*	66.14 *(49.32)*
Speed—Mph *(km/h)*	5.44 *(8.76)*	4.88 *(7.86)*	4.30 *(6.92)*	3.77 *(6.06)*	3.24 *(5.22)*	2.72 *(4.37)*
Slip %	5.04	5.52	5.84	6.00	5.36	4.38

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive Engaged dB(A)	Disengaged dB(A)
Maximum Available Power—Two Hours	82.0	81.5
75% of Pull at Maximum Power—Ten Hours	81.5	
50% of Pull at Maximum Power—Two Hours	81.5	
50% of Pull at Reduced Engine Speed—Two Hours	79.0	
Bystander in 16th (8H) gear		88.5

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 8th (5L) Gear											
140.64 *(104.88)*	10079 *(44.83)*	5.23 *(8.42)*	2200	8.23	10.128 *(38.337)*	0.502 *(0.306)*	13.89 *(2.736)*	206 *(96.4)*	63 *(17.2)*	78 *(25.3)*	28.85 *(97.42)*
MAXIMUM POWER IN SELECTED GEARS											
125.15 *(93.33)*	13887 *(61.77)*	3.38 *(5.44)*	2314	14.81	5th (2H) Gear			195 *(90.3)*	58 *(14.4)*	65 *(18.3)*	28.83 *(97.35)*
143.24 *(106.81)*	10180 *(45.32)*	5.27 *(8.48)*	2199	7.02	8th (5L) Gear			203 *(94.7)*	63 *(17.2)*	75 *(23.9)*	29.00 *(97.93)*

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 20.8-38; 10; 16 *(110)*	Four 20.8-38; 10; 16 *(110)*
Ballast	—Liquid (each inner)	373 lb *(170 kg)*	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 16.9-28; 6; 18 *(125)*	Two 16.9-28; 6; 18 *(125)*
Ballast	—Liquid (each)	440 lb *(200 kg)*	None
	—Cast Iron (each)	750 lb *(340 kg)*	None
Height of Drawbar		24.5 in *(620 mm)*	24.5 in *(620 mm)*
Static Weight with Operator	—Rear	12400 lb *(5625 kg)*	11650 lb *(5285 kg)*
	—Front	7870 lb *(3570 kg)*	5490 lb *(2490 kg)*
	—Total	20270 lb *(9195 kg)*	17140 lb *(7775 kg)*

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi *(kpa)* Location	2550 remote	*17580*	
Hydraulic oil temperature °F *(°C)* Location	104 sump	*40*	
	Maximum Lift Capacity		Lift Capacity for Transport
QUICK ATTACH CATEGORY	no II		 *not measured
LOAD lbs *(kg)* TIME sec	7158 2.04	*3247*	
HITCH POINT MOVEMENT in *(mm)*			
Lowest position	9.1	*232*	
Top of timed range	33.1	*841*	
Highest position	36.6	*930*	
LOAD CG MOVEMENT in *(mm)*			
Lowest position	9.3	*235*	
Top of timed range	32.8	*832*	
Highest position	36.6	*930*	

*Implement load capacity for transport purposes not specified by manufacturer.

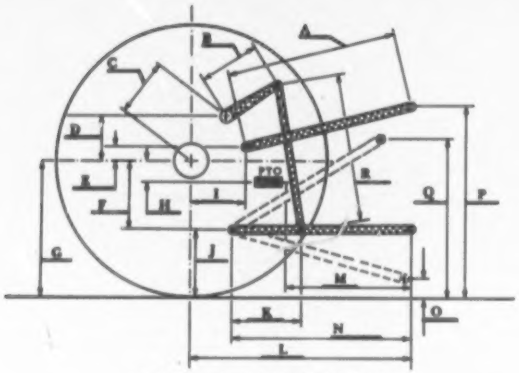
REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 183°F *(84.0°C)*. Nine gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1537, November 26, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Hitch Dimensions as Tested — No Load

	inch	mm
A	28.9	*734*
B	15.0	*381*
C	16.2	*412*
D	15.5	*394*
E	8.0	*203*
F	10.5	*267*
G	33.9	*861*
H	2.4	*62*
I	17.0	*432*
J	23.4	*594*
K	18.9	*481*
L	45.3	*1150*
M	23.6	*600*
N	36.3	*921*
O	8.0	*203*
P	42.4	*1077*
Q	37.0	*940*
R	33.1	*841*

Ford TW-35 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1519 — MASSEY FERGUSON 240 DIESEL
8 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—604 rpm)								
34.77 (25.93)	2000	2.173 (8.226)	0.438 (0.266)	16.00 (3.152)	186 (85.4)	61 (16.0)	75 (24.0)	29.17 (98.50)
Standard Power Take-off Speed (540 rpm) — One hour)								
31.89 (23.78)	1788	1.981 (7.496)	0.435 (0.265)	16.10 (3.172)	186 (85.6)	64 (17.5)	75 (24.0)	29.16 (98.45)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
30.27 (22.57)	2050	1.928 (7.297)	0.466 (0.271)	15.70 (3.093)	183 (83.9)	65 (18.1)	75 (23.6)	....
0.00 (0.00)	2155	0.630 (2.384)	....	....	177 (80.3)	65 (18.3)	76 (24.2)	....
15.46 (11.53)	2095	1.225 (4.638)	0.555 (0.338)	12.62 (2.486)	179 (81.7)	66 (18.6)	76 (24.4)	....
34.36 (25.62)	2000	2.155 (8.157)	0.439 (0.267)	15.94 (3.141)	186 (85.6)	66 (18.9)	76 (24.4)	....
7.81 (5.82)	2113	0.921 (3.486)	0.826 (0.502)	8.48 (1.670)	178 (81.1)	66 (18.6)	76 (24.2)	....
22.98 (17.13)	2073	1.555 (5.886)	0.474 (0.288)	14.78 (2.911)	181 (82.8)	66 (18.9)	75 (23.9)	....
Av 18.48 Av (13.78)	2077	1.402 (5.308)	0.531 (0.323)	13.18 (2.596)	181 (82.5)	65 (19.6)	75 (24.1)	29.14 (98.38)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 5th (1H) Gear											
28.69 (21.40)	2027 (9.02)	5.31 (8.54)	2000	6.06	2.092 (7.919)	0.511 (0.311)	13.72 (2.702)	191 (88.3)	67 (19.2)	76 (24.4)	28.68 (96.83)
75% of Pull at Maximum Power—Ten Hours 5th (1H) Gear											
22.97 (17.13)	1560 (6.94)	5.52 (8.89)	2042	4.30	1.721 (6.514)	0.525 (0.319)	13.35 (2.630)	187 (86.2)	58 (14.3)	69 (20.3)	29.02 (97.99)
50% of Pull at Maximum Power—Two Hours 5th (1H) Gear											
15.80 (11.78)	1041 (4.63)	5.70 (9.17)	2076	2.87	1.364 (5.162)	0.604 (0.368)	11.39 (2.283)	187 (85.8)	68 (20.0)	81 (26.9)	28.67 (96.81)
50% of Pull at Reduced Engine Speed—Two Hours 6th (2H) Gear											
15.78 (11.77)	1039 (4.62)	5.70 (9.17)	1413	2.69	1.121 (4.243)	0.497 (0.303)	14.08 (2.774)	187 (85.8)	70 (21.1)	84 (28.9)	28.68 (96.85)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
18.62 (13.89)	3824 (17.01)	1.83 (2.94)	2067	14.80	2nd (2L) Gear	186 (85.3)	61 (16.[illegible])	67 (19.4)	28.69 (96.88)
28.25 (21.07)	3100 (13.79)	3.42 (5.50)	2000	10.06	3rd (3L) Gear	189 (87.2)	62 (16.7)	69 (20.6)	28.68 (96.85)
28.45 (21.21)	2477 (11.02)	4.31 (6.93)	2000	7.57	4th (4L) Gear	190 (87.8)	63 (17.2)	70 (21.1)	28.68 (96.85)
29.39 (21.92)	2080 (9.25)	5.30 (8.53)	1999	6.17	5th (1H) Gear	190 (87.8)	64 (17.8)	73 (22.8)	28.67 (96.81)
29.05 (21.67)	1369 (6.09)	7.96 (12.81)	2002	4.03	6th (2H) Gear	190 (87.8)	63 (17.2)	71 (21.7)	28.67 (96.81)

LUGGING ABILITY IN 5th (1H) GEAR

Crankshaft Speed rpm	1999	1797	1602	1397	1197	1000
Pull—lbs (kN)	2080 (9.25)	2179 (9.77)	2292 (10.27)	2342 (10.50)	2357 (10.56)	2324 (10.42)
Increase in Pull %	0	5	10	13	13	12
Power—Hp (kW)	29.39 (21.92)	27.39 (20.38)	25.76 (19.21)	22.89 (17.07)	19.69 (14.68)	16.27 (12.13)
Speed—Mph (km/h)	5.30 (8.53)	4.75 (7.64)	4.21 (6.78)	3.66 (5.90)	3.13 (5.04)	2.62 (4.22)
Slip %	6.17	6.36	6.95	7.14	7.56	7.14

Department of Agricultural Engineering

Dates of Test: May 9 to June 4, 1984

Manufacturer: MASSEY FERGUSON MANUFACTURING CO., P.O Box 62 Banner Lane, Coventry CV4 9GF Warwickshire, England

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8410 **Fuel weight** 7.003 lbs/gal *(0.839 kg/l)* **Oil SAE** 15W-40 **API service classification** SE, SF, CC, CD **To motor** 1.750 gal *(6.624 l)* **Drained from motor** 1.061 gal *(4.017 l)* **Transmission and final drive lubricant** Massey Ferguson Permatran III fluid **Total time engine was operated** 41.0 hours.

ENGINE: **Make** Perkins Diesel **Type** three cylinder vertical **Serial No.** CE31106U731446K **Crankshaft** lengthwise **Rated rpm** 2000 **Bore and stroke** 3.6" × 5.0" *(91.4 mm × 127 mm)* **Compression ratio** 18.5 to 1 **Displacement** 152 cu in *(2491 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Fuel filter** two paper elements **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** standard **Serial No.** 552212 **Tread width** rear 52" *(1321 mm)* to 72" *(1829 mm)* front 52" *(1321 mm)* to 72" *(1829 mm)* **Wheel base** 76" *(1930 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 28.5" *(724 mm)* Vertical distance above roadway 27.0" *(685 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** constant running except when PTO clutch is disengaged **Transmission** selective gear fixed ratio **Advertised speeds mph** *(km/h)* first 1.4 *(2.3)* second 2.1 *(3.4)* third 3.8 *(6.2)* fourth 4.7 *(7.6)* fifth 5.7 *(9.2)* sixth 8.4 *(13.4)* seventh 15.3 *(24.7)* eighth 18.8 *(30.3)* reverse 1.9 *(3.1)*, 7.8 *(12.5)* **Clutch** single dry disc operated by foot pedal **Brakes** drum and shoe operated by two foot pedals which can be locked together and hand lever **Steering** power assist **Turning radius** (on concrete surface with brake applied) right 117" *(2.97 m)* left 118" *(3.00 m)* (on concrete surface without brake) right 131" *(3.32 m)* left 128" *(3.25 m)* **Turning space diameter** (on concrete surface with brake applied) right 240" *(6.10 m)* left 242" *(6.15 m)* (on concrete surface without brake) right 268" *(6.82 m)* left 262" *(6.66 m)* **Power take-off** 540 rpm at 1788 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)
Maximum Available Power—Two Hours	95.5
75% of Pull at Maximum Power—Ten Hours	94.0
50% of Pull at Maximum Power—Two Hours	93.5
50% of Pull at Reduced Engine Speed—Two Hours	91.0
Bystander in 7th (3H) gear	85.0

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 13.6-28; 4; 14 *(95)*	Two 13.6-28; 4; 14 *(95)*
Ballast	—Liquid (each)	342 lb *(155 kg)*	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 6.00-16; 4; 32 *(220)*	Two 6.00-16; 4; 32 *(220)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	43 lb *(19 kg)*	None
Height of Drawbar		14 in *(355 mm)*	14 in *(355 mm)*
Static Weight with Operator	—Rear	3350 lb *(1519 kg)*	2665 lb *(1209 kg)*
	—Front	1635 lb *(742 kg)*	1550 lb *(703 kg)*
	—Total	4985 lb *(2261 kg)*	4215 lb *(1912 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 139°F *(59.3°C)*. Five gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1519**, July 3, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

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Board of Tractor Test Engineers

Massey Ferguson 240 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1520 — MASSEY FERGUSON 250 DIESEL 8 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—679 rpm)								
40.86 (30.47)	2250	2.707 (10.249)	0.464 (0.282)	15.09 (2.974)	182 (83.4)	58 (14.4)	75 (23.8)	29.16 (98.48)
Standard Power Take-off Speed (540 rpm) — One hour)								
36.93 (27.54)	1789	2.338 (8.848)	0.443 (0.270)	15.80 (3.113)	185 (85.1)	58 (14.4)	75 (23.9)	29.13 (98.37)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
36.64 (27.32)	2374	2.450 (9.275)	0.468 (0.285)	14.95 (2.945)	180 (81.9)	58 (14.2)	75 (23.9)	......
0.00 (0.00)	2455	0.825 (3.113)	......	......	167 (75.0)	57 (13.9)	74 (23.3)	......
18.56 (13.84)	2405	1.568 (5.935)	0.592 (0.360)	11.84 (2.332)	173 (78.3)	58 (14.4)	75 (23.9)	......
40.75 (30.39)	2250	2.733 (10.346)	0.470 (0.286)	14.91 (2.937)	182 (83.1)	58 (14.4)	75 (23.9)	......
9.31 (6.94)	2416	1.178 (4.459)	0.886 (0.539)	7.90 (1.556)	170 (76.7)	58 (14.4)	75 (23.9)	......
27.64 (20.61)	2388	1.979 (7.492)	0.501 (0.305)	13.96 (2.751)	176 (80.0)	60 (15.3)	76 (24.4)	......
Av 22.15 Av (16.52)	2378	1.789 (6.770)	0.565 (0.344)	12.38 (2.440)	175 (79.2)	58 (14.4)	75 (23.9)	29.00 (98.21)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 5th (1H) Gear											
34.69 (25.87)	2242 (9.97)	5.80 (9.34)	2250	5.77	2.685 (10.162)	0.542 (0.330)	12.92 (2.545)	186 (85.3)	56 (13.3)	63 (16.9)	28.81 (97.29)
75% of Pull at Maximum Power—Ten Hours 5th (1H) Gear											
28.18 (21.02)	1698 (7.55)	6.22 (10.02)	2376	4.34	2.255 (8.535)	0.560 (0.341)	12.50 (2.462)	180 (81.9)	52 (11.1)	60 (15.6)	29.07 (98.17)
50% of Pull at Maximum Power—Two Hours 5th (1H) Gear											
19.05 (14.21)	1127 (5.01)	6.34 (10.20)	2395	3.32	1.778 (6.730)	0.654 (0.398)	10.72 (2.111)	176 (80.0)	52 (10.8)	56 (13.1)	28.81 (97.27)
50% of Pull at Reduced Engine Speed—Two Hours 6th (2H) Gear											
19.04 (14.20)	1126 (5.01)	6.34 (10.20)	1632	3.20	1.421 (5.378)	0.523 (0.318)	13.40 (2.640)	176 (79.7)	53 (11.4)	57 (13.6)	28.82 (97.32)

MAXIMUM POWER IN SELECTED GEARS

23.97 (17.88)	4297 (19.11)	2.09 (3.37)	2388	12.74	2nd (2L) Gear	177 (80.6)	51 (10.6)	53 (11.7)	28.79 (97.22)
33.53 (25.00)	3350 (14.90)	3.75 (6.04)	2251	9.42	3rd (3L) Gear	183 (83.9)	51 (10.6)	53 (11.7)	28.79 (97.22)
33.92 (25.30)	2705 (12.03)	4.71 (7.58)	2251	7.44	4th (4L) Gear	184 (84.4)	51 (10.6)	54 (12.2)	28.79 (97.22)
35.07 (26.15)	2264 (10.07)	5.81 (9.35)	2250	5.66	5th (1H) Gear	186 (85.3)	56 (13.3)	63 (17.2)	28.83 (97.35)
34.45 (25.69)	1490 (6.63)	8.67 (13.96)	2250	4.05	6th (2H) Gear	184 (84.4)	51 (10.6)	54 (12.2)	28.78 (97.19)

LUGGING ABILITY IN 5th (1H) GEAR

Crankshaft Speed rpm	2250	2026	1805	1571	1355	1126
Pull—lbs (kN)	2264 (10.07)	2421 (10.85)	2585 (11.50)	2712 (12.16)	2768 (12.41)	2710 (12.15)
Increase in Pull %	0	7	14	20	22	20
Power—Hp (kW)	35.07 (26.15)	33.49 (24.98)	31.68 (23.62)	28.85 (21.52)	25.33 (18.89)	20.66 (15.40)
Speed—Mph (km/h)	5.81 (9.35)	5.19 (8.35)	4.60 (7.40)	3.99 (6.42)	3.43 (5.52)	2.86 (4.60)
Slip %	5.66	6.42	6.96	7.39	7.39	7.39

Department of Agricultural Engineering

Dates of Test: May 10-29, 1984

Manufacturer: MASSEY FERGUSON MANUFACTURING CO., P.O Box 62 Banner Lane, Coventry CV4 9GF Warwickshire, England

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8410 **Fuel weight** 7.003 lbs/gal *(0.839 kg/l)* **Oil SAE** 15W-40 **API service classification** SE, SF, CC, CD **To motor** 2.495 gal *(9.444 l)* **Drained from motor** 1.144 gal *(4.332 l)* **Transmission and final drive lubricant** Massey Ferguson Permatran III fluid **Total time engine was operated** 43.0 hours.

ENGINE: **Make** Perkins Diesel **Type** three cylinder vertical **Serial No.** CE2248U73580L **Crankshaft** lengthwise **Rated rpm** 2250 **Bore and stroke** 3.6" × 5" *(91.4 mm × 127 mm)* **Compression ratio** 18.5 to 1 **Displacement** 152 cu in *(2491 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Fuel filter** two paper elements **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** standard **Serial No.** 624034 **Tread width** rear 52" *(1321 mm)* to 90" *(2286 mm)* front 52" *(1321 mm)* to 72" *(1829 mm)* **Wheel base** 76" *(1930 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 26.0" *(660 mm)* Vertical distance above roadway 27.0" *(686 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** constant running except when PTO clutch is disengaged **Transmission** selective gear fixed ratio **Advertised speeds mph (km/h)** first 1.6 *(2.5)* second 2.3 *(3.7)* third 4.2 *(6.8)* fourth 5.2 *(8.3)* fifth 6.3 *(10.1)* sixth 9.2 *(14.8)* seventh 16.9 *(27.2)* eighth 20.8 *(33.4)* reverse 2.2 *(3.5)*, 8.6 *(13.8)* **Clutch** single dry disc operated by foot pedal **Brakes** multiple wet disc operated by two foot pedals which can be locked together and hand lever **Steering** power assist **Turning radius** (on concrete surface with brake applied) right 117" *(2.97 m)* left 118" *(3.00 m)* (on concrete surface without brake) right 131" *(3.32 m)* left 128" *(3.25 m)* **Turning space diameter** (on concrete surface with brake applied) right 240" *(6.10 m)* left 242" *(6.15 m)* (on concrete surface without brake) right 268" *(6.82 m)* left 262" *(6.66 m)* **Power take-off** 540 rpm at 1789 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)
Maximum Available Power—Two Hours	95.5
75% of Pull at Maximum Power—Ten Hours	96.0
50% of Pull at Maximum Power—Two Hours	95.0
50% of Pull at Reduced Engine Speed—Two Hours	91.0
Bystander in 7th (3H) gear	83.5

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 13.6-28; 4; 14 (95)	Two 13.6-28; 4; 14 (95)
Ballast	—Liquid (each)	470 lb *(213 kg)*	None
	—Cast Iron (each)	80 lb *(36 kg)*	None
Front Tires	—No., size, ply & psi (kPa)	Two 6.00-16; 4; 32 (220)	Two 6.00-16; 4; 32 (220)
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	37 lb *(17 kg)*	None
Height of Drawbar		17.5 in *(445 mm)*	17.5 in *(445 mm)*
Static Weight with Operator—Rear		4140 lb *(1878 kg)*	3040 lb *(1379 kg)*
—Front		1080 lb *(735 kg)*	1545 lb *(701 kg)*
—Total		5700 lb *(2613 kg)*	4585 lb *(2080 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 140°F *(63.2°C)*. Five gears were chosen between tire tangential pull limit and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1520, July 3, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Massey Ferguson 250 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
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Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1521 — MASSEY FERGUSON 270 DIESEL 8 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—642 rpm)								
55.86 (41.66)	2000	3.640 (13.780)	0.451 ([illegible])	15.25 ([illegible])	185 ([illegible])	65 (18.4)	75 (24.1)	29.04 ([illegible])
Standard Power Take-off Speed (540 rpm) — One hour								
52.75 (39.33)	1685	3.142 (11.894)	0.417 (0.254)	16.79 ([illegible])	190 ([illegible])	66 ([illegible])	76 (24.4)	29.03 ([illegible])
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
48.62 (36.26)	2000	3.072 (11.627)	0.442 (0.269)	15.83 (3.118)	182 (83.3)	66 (18.9)	77 (24.7)	....
0.00 (0.00)	2301	1.161 (4.394)	....	....	177 (80.6)	66 (18.9)	75 (23.9)	....
25.40 (18.94)	2141	2.082 (7.881)	0.574 (0.349)	12.20 (2.403)	179 (81.7)	66 (18.9)	76 (24.2)	....
54.00 (40.27)	2001	3.466 (13.119)	0.439 (0.266)	15.58 (3.222)	185 (85.0)	66 (18.9)	77 (24.7)	....
12.90 (9.62)	2175	1.602 (6.065)	0.870 (0.529)	8.05 (1.587)	178 (81.1)	67 (19.4)	77 (25.0)	....
37.20 (27.80)	2094	2.545 (9.632)	0.478 (0.291)	14.66 (2.886)	181 (82.7)	66 (18.9)	77 (25.0)	....
Av 30.15 Av ([illegible])	2110	2.321 ([illegible])	[illegible] ([illegible])	12.99 ([illegible])	180 ([illegible])	66 ([illegible])	76 ([illegible])	29.01 (97.97)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 5th (1H) Gear											
46.26 (34.50)	3492 (15.53)	4.97 (8.00)	1980	7.20	3.441 (13.027)	0.521 (0.317)	13.44 (2.648)	191 (88.3)	68 (19.7)	76 (24.2)	28.61 (96.90)
75% of Pull at Maximum Power—Two Hours 5th (1H) Gear											
37.34 (27.85)	2660 (11.83)	5.25 (8.44)	2058	4.98	2.802 ([illegible])	0.535 ([illegible])	13.16 (2.593)	187 (86.1)	62 (16.6)	67 (19.2)	28.87 ([illegible])
50% of Pull at Maximum Power—Two Hours 5th (1H) Gear											
25.96 (19.36)	1780 (7.92)	5.47 (8.80)	2111	3.54	2.315 (8.757)	0.634 ([illegible])	11.22 (2.211)	187 (86.1)	70 (20.8)	80 (26.4)	28.59 ([illegible])
50% of Pull at Reduced Engine Speed—Two Hours 6th (2H) Gear											
25.90 (19.32)	1770 (7.91)	5.48 (8.82)	1430	3.21	1.849 ([illegible])	0.498 ([illegible])	14.06 (2.769)	185 ([illegible])	73 (22.3)	81 ([illegible])	28.58 ([illegible])
MAXIMUM POWER IN SELECTED GEARS											
37.07 ([illegible])	5896 (26.23)	1.72 (2.77)	2100	14.87	2nd (2L) Gear			185 (85.3)	64 (17.8)	69 (20.6)	28.64 (96.71)
44.31 (33.04)	5446 (24.23)	3.05 (4.91)	1999	13.42	3rd (3L) Gear			190 (87.5)	65 (18.3)	72 (22.2)	28.63 ([illegible])
46.05 (34.34)	4425 (19.68)	3.90 (6.28)	2001	9.84	4th (4L) Gear			191 (88.1)	64 (17.8)	72 (22.2)	28.63 ([illegible])
47.08 (35.11)	3568 (15.88)	4.96 (7.99)	1999	7.44	5th (1H) Gear			190 ([illegible])	66 (18.9)	74 (23.3)	28.62 ([illegible])
47.04 (35.08)	2354 (10.47)	7.50 (12.06)	2000	4.77	6th (2H) Gear			189 (87.2)	64 (17.8)	72 (22.2)	28.62 ([illegible])

LUGGING ABILITY IN 5th (1H) GEAR

Crankshaft Speed rpm	1999	1801	1597	1393	1200	1000
Pull—lbs (kN)	3568 (15.88)	3861 (17.20)	4072 (18.25)	4239 (18.86)	4325 ([illegible])	4170 ([illegible])
Increase in Pull %	0	8	14	19	22	17
Power—Hp (kW)	47.08 (35.11)	45.67 ([illegible])	42.47 (31.67)	38.22 (28.50)	33.55 (25.02)	27.07 (20.19)
Speed—Mph (km/h)	4.96 (7.99)	4.44 (7.14)	3.91 (6.29)	3.39 ([illegible])	2.91 (4.68)	2.43 (3.92)
Slip %	7.44	8.00	8.60	9.38	9.61	9.38

Department of Agricultural Engineering

Dates of Test: May 10-25, 1984

Manufacturer: MASSEY FERGUSON MANUFACTURING CO., P.O Box 62 Banner Lane, Coventry CV4 9GF Warwickshire, England

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8410 **Fuel weight** 7.003 lbs/gal *(0.839 kg/l)* **Oil SAE** 15W-40 **API service classification** SE, SF, CC, CD **To motor** 1.754 gal *(6.639 l)* **Drained from motor** 1.571 gal *(5.946 l)* **Transmission and final drive lubricant** Massey Ferguson Permatran III fluid **Total time engine was operated** 49.0 hours.

ENGINE: **Make** Perkins Diesel **Type** four cylinder vertical **Serial No.** LD22794U932437R **Crankshaft** lengthwise **Rated rpm** 2000 **Bore and stroke** 3.875" × 5.0" *(98.4 mm × 127 mm)* **Compression ratio** 16 to 1 **Displacement** 236 cu in *(3863 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** radiator for hydraulic and transmission oil **Fuel filter** one paper element and sediment bowl **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** standard **Serial No.** 287194 **Tread width** rear 56" *(1422 mm)* to 90" *(2286 mm)* front 52" *(1321 mm)* to 72" *(1829 mm)* **Wheel base** 84" *(2134 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 27.5" *(700 mm)* Vertical distance above roadway 32.0" *(813 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph (km/h)** first 1.3 *(2.1)* second 1.9 *(3.1)* third 3.5 *(5.6)* fourth 4.3 *(6.9)* fifth 5.3 *(8.6)* sixth 7.8 *(12.6)* seventh 14.3 *(23.1)* eighth 17.6 *(28.3)* reverse 1.8 *(2.9)*, 7.2 *(11.6)* **Clutch** single dry disc operated by foot pedal **Brakes** multiple wet disc hydraulically operated by two foot pedals which can be locked together and mechanically by hand lever **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 131" *(3.33 m)* left 128" *(3.25 m)* (on concrete surface without brake) right 157" *(3.99 m)* left 151" *(3.84 m)* **Turning space diameter** (on concrete surface with brake applied) right 270" *(6.86 m)* left 264" *(6.71 m)* (on concrete surface without brake) right 322" *(8.18 m)* left 310" *(7.87 m)* **Power take-off** 540 rpm at 1685 engine rpm.

REPAIRS and ADJUSTMENTS: The PTO clutch was adjusted during preliminary PTO tests.

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)
Maximum Available Power—Two Hours	98.5
75% of Pull at Maximum Power—Two Hours	94.0
50% of Pull at Maximum Power—Two Hours	95.0
50% of Pull at Reduced Engine Speed—Two Hours	91.5
Bystander in 7th (3H) gear	86.5

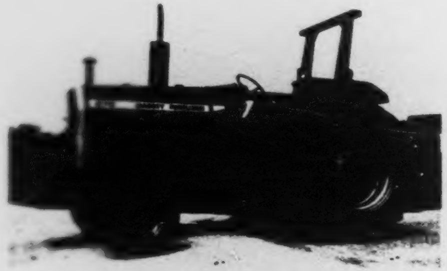
TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 16.9-30; 6; 18 *(125)*	Two 16.9-30; 6; 18 *(125)*
Ballast	—Liquid (each)	595 lb *(270 kg)*	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi (kPa)	Two 7.5L-15; 6; 44 *(305)*	Two 7.5L-15; 6; 44 *(305)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	88 lb *(40 kg)*	None
Height of Drawbar		19.5 in *(495 mm)*	19.5 in *(495 mm)*
Static Weight with Operator—Rear		5885 lb *(2669 kg)*	4695 lb *(2130 kg)*
—Front		2310 lb *(1048 kg)*	2205 lb *(1000 kg)*
—Total		8195 lb *(3717 kg)*	6900 lb *(3130 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 149°F *(65.1°C)*. Five gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1521, July 3, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Massey Ferguson 270 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1522
MASSEY FERGUSON 290 MULTIPOWER DIESEL
12 SPEED ALSO 8 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F *(°C)* Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—664 rpm)								
65.92 *(49.16)*	2200	4.234 *(16.025)*	0.450 *(0.274)*	15.57 *(3.068)*	187 *(86.1)*	60 *(15.6)*	75 *(23.8)*	28.79 *(97.21)*
Standard Power Take-off Speed (540 rpm) — One hour)								
59.37 *(44.27)*	1789	3.581 *(13.555)*	0.422 *(0.257)*	16.58 *(3.266)*	187 *(86.1)*	60 *(15.6)*	75 *(23.9)*	28.78 *(97.17)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
56.12 *(43.34)*	2282	3.778 *(14.302)*	0.455 *(0.277)*	15.38 *(3.030)*	184 *(84.4)*	61 *(16.1)*	77 *(25.0)*	....
0.00 *(0.00)*	2380	1.285 *(4.865)*	....	....	175 *(79.4)*	61 *(15.8)*	76 *(24.2)*	....
29.83 *(22.24)*	2338	2.468 *(9.340)*	0.579 *(0.352)*	12.09 *(2.381)*	179 *(81.7)*	60 *(15.6)*	75 *(23.9)*	....
66.20 *(49.37)*	2201	4.250 *(16.088)*	0.450 *(0.273)*	15.58 *(3.069)*	187 *(86.1)*	60 *(15.6)*	75 *(23.9)*	....
15.05 *(11.21)*	2361	1.868 *(7.070)*	0.870 *(0.529)*	8.05 *(1.586)*	179 *(81.7)*	60 *(15.3)*	75 *(23.6)*	....
44.13 *(32.91)*	2311	3.084 *(11.675)*	0.489 *(0.298)*	14.31 *(2.818)*	181 *(82.8)*	60 *(15.6)*	75 *(23.6)*	....
Av 35.55 **Av** *(26.51)*	2312	2.789 *(10.556)*	0.549 *(0.334)*	12.75 *(2.511)*	181 *(82.7)*	60 *(15.6)*	75 *(24.0)*	28.79 *(97.23)*

DRAWBAR PERFORMANCE

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F *(°C)* Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 7th (1HL) Gear											
55.32 *(41.25)*	4260 *(18.95)*	4.87 *(7.84)*	2201	6.98	4.177 *(15.811)*	0.529 *(0.322)*	13.24 *(2.609)*	188 *(86.4)*	52 *(10.8)*	59 *(14.7)*	29.32 *(99.01)*
75% of Pull at Maximum Power—Ten Hours 7th (1HL) Gear											
44.95 *(33.50)*	3241 *(14.42)*	5.20 *(8.37)*	2294	4.78	3.521 *(13.330)*	0.549 *(0.334)*	12.76 *(2.514)*	186 *(85.7)*	61 *(15.9)*	65 *(18.5)*	29.29 *(98.90)*
50% of Pull at Maximum Power—Two Hours 7th (1HL) Gear											
30.80 *(22.97)*	2161 *(9.61)*	5.34 *(8.60)*	2323	3.37	2.806 *(10.622)*	0.638 *(0.388)*	10.98 *(2.162)*	185 *(84.7)*	54 *(11.9)*	63 *(16.9)*	29.31 *(98.96)*
50% of Pull at Reduced Engine Speed—Two Hours 9th (2HL) Gear											
30.81 *(22.98)*	2161 *(9.61)*	5.35 *(8.61)*	1584	3.25	2.192 *(8.297)*	0.498 *(0.303)*	14.06 *(2.769)*	184 *(84.2)*	61 *(15.8)*	66 *(18.9)*	29.28 *(98.86)*
MAXIMUM POWER IN SELECTED GEARS											
44.35 *(33.07)*	7654 *(34.05)*	2.17 *(3.50)*	2290	14.54	4th (2LH) Gear			186 *(85.6)*	46 *(7.8)*	50 *(10.0)*	29.26 *(98.81)*
53.54 *(39.92)*	6593 *(29.33)*	3.04 *(4.90)*	2201	11.61	5th (3LL) Gear			187 *(85.8)*	47 *(8.3)*	51 *(10.6)*	29.27 *(98.84)*
55.39 *(41.31)*	5075 *(22.57)*	4.09 *(6.59)*	2200	8.42	6th (3LH) Gear			187 *(85.8)*	47 *(8.3)*	52 *(11.1)*	29.28 *(98.87)*
56.10 *(41.84)*	4321 *(19.22)*	4.87 *(7.84)*	2200	6.98	7th (1HL) Gear			187 *(86.1)*	50 *(10.0)*	55 *(12.8)*	29.31 *(98.98)*
56.36 *(42.03)*	3284 *(14.61)*	6.44 *(10.36)*	2198	5.38	8th (1HH) Gear			187 *(86.1)*	48 *(8.9)*	53 *(11.7)*	29.29 *(98.91)*
55.46 *(41.35)*	2839 *(12.63)*	7.33 *(11.79)*	2201	4.58	9th (2HL) Gear			187 *(85.8)*	49 *(9.4)*	54 *(12.2)*	29.30 *(98.94)*
54.81 *(40.87)*	2134 *(9.49)*	9.63 *(15.50)*	2199	3.51	10th (2HH) Gear			187 *(85.8)*	49 *(9.4)*	54 *(12.2)*	29.31 *(98.98)*

Department of Agricultural Engineering

Dates of Test: May 11-31, 1984

Manufacturer: MASSEY FERGUSON MANUFACTURING CO., P.O Box 62 Banner Lane, Coventry CV4 9GF Warwickshire, England

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8410 **Fuel weight** 7.003 lbs/gal *(0.839 kg/l)* **Oil SAE** 15W-40 **API service classification** SE, SF, CC, CD **To motor** 1.576 gal *(5.967 l)* **Drained from motor** 1.382 gal *(5.230 l)* **Transmission and final drive lubricant** Massey Ferguson Permatran III fluid **Total time engine was operated** 48.5 hours.

ENGINE: **Make** Perkins Diesel **Type** four cylinder vertical **Serial No.** LF22790U886774K **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** 3.975" × 5" *(101 mm × 127 mm)* **Compression ratio** 16 to 1 **Displacement** 248 cu in *(4065 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** radiator for hydraulic and transmission oil **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat.

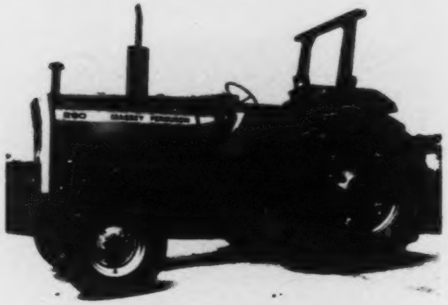
CHASSIS: **Type** standard **Serial No.** 389979 **Tread width** rear 56" *(1422 mm)* to 90" *(2286 mm)* front 52" *(1321 mm)* to 72" *(1829 mm)* **Wheel base** 84" *(2134 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 32.3" *(820 mm)* Vertical distance above roadway 33.0" *(838 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph** *(km/h)* first 1.3 *(2.1)* second 1.7 *(2.7)* third 1.9 *(3.1)* fourth 2.5 *(4.0)* fifth 3.5 *(5.7)* sixth 4.6 *(7.4)* seventh 5.4 *(8.6)* eighth 7.0 *(11.2)* ninth 7.9 *(12.7)* tenth 10.3 *(16.5)* eleventh 14.4 *(23.2)* twelfth 18.8 *(30.2)* reverse 1.8 *(2.9)*, 2.3 *(3.7)* 7.3 *(11.8)* 9.5 *(15.3)* **Clutch** single dry disc operated by foot pedal **Brakes** multiple wet disc hydraulically operated by two foot pedals which can be locked together and mechanically by hand lever **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 128" *(3.25 m)* left 124" *(3.15 m)* (on concrete surface without brake) right 152" *(3.86 m)* left 148" *(3.76 m)* **Turning space diameter** (on concrete surface with brake applied) right 265" *(6.73 m)* left 257" *(6.53 m)* (on concrete surface without brake) right 312" *(7.92 m)* left 303" *(7.70 m)* **Power take-off** 540 rpm at 1789 engine rpm.

LUGGING ABILITY IN 7th (1HL) GEAR

Crankshaft Speed rpm	2200	1986	1751	1541	1314	1097
Pull—lbs *(kN)*	4321 *(19.22)*	4603 *(20.63)*	4855 *(21.76)*	4932 *(22.11)*	5102 *(22.87)*	5033 *(22.36)*
Increase in Pull %	0	7	12	14	18	16
Power—Hp *(kW)*	56.10 *(41.84)*	53.66 *(40.02)*	49.65 *(37.03)*	44.31 *(33.04)*	38.94 *(29.04)*	32.08 *(23.92)*
Speed—Mph *(km/h)*	4.87 *(7.84)*	4.37 *(7.04)*	3.84 *(6.17)*	3.37 *(5.42)*	2.86 *(4.61)*	2.39 *(3.85)*
Slip %	6.98	7.55	8.05	8.05	8.54	8.42

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)
Maximum Available Power—Two Hours	97.5
75% of Pull at Maximum Power—Ten Hours	96.5
50% of Pull at Maximum Power—Two Hours	95.5
50% of Pull at Reduced Engine Speed—Two Hours	93.8
Bystander in 12th (3HH) gear	89.0

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 18.4-30; 6; 16 *(110)*	Two 18.4-30; 6; 16 *(110)*
Ballast	—Liquid (each)	905 lb *(410 kg)*	None
	—Cast Iron (each)	610 lb *(277 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 7.50-16; 6; 40 *(275)*	Two 7.50-16; 6; 40 *(275)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	50 lb *(23 kg)*	None
Height of Drawbar		16 in *(406 mm)*	16 in *(406 mm)*
Static Weight with Operator	—Rear	6755 lb *(3064 kg)*	3725 lb *(1690 kg)*
	—Front	2315 lb *(1050 kg)*	2215 lb *(1005 kg)*
	—Total	9070 lb *(4114 kg)*	5940 lb *(2694 kg)*



Massey Ferguson 290 Multipower Diesel

REPAIRS and ADJUSTMENTS: During the limber up run, the left rear tire developed a fluid leak between the tire bead and rim. A tube was installed and test continued.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 156°F *(68.6°C)*. Seven gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1522, July 3, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1523 — MASSEY FERGUSON 298 DIESEL 8 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1182 rpm)								
79.54 (59.32)	2000	5.122 (19.387)	0.451 (0.274)	15.53 (3.060)	185 (85.0)	63 (17.3)	75 (23.9)	28.83 (97.37)
Standard Power Take-off Speed (1000 rpm) — One hour								
73.66 (54.93)	1692	4.517 (17.099)	0.429 (0.261)	16.31 (3.213)	184 (84.4)	64 (17.7)	75 (23.9)	28.86 (97.44)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
70.67 (52.70)	2091	4.575 (17.318)	0.455 (0.276)	15.45 (3.043)	182 (83.1)	65 (18.1)	76 (24.2)	....
0.00 (0.00)	2219	1.641 (6.211)	....	....	176 (80.0)	64 (17.5)	74 (23.1)	....
36.49 (27.21)	2100	2.943 (11.140)	0.565 (0.344)	12.40 (2.443)	179 (81.7)	64 (17.8)	76 (24.2)	....
80.05 (59.69)	2000	5.162 (19.540)	0.452 (0.275)	15.51 (3.055)	185 (84.7)	63 (17.2)	76 (24.2)	....
21.19 (15.80)	2186	2.356 (8.919)	0.779 (0.474)	8.99 (1.772)	177 (80.6)	62 (16.7)	74 (23.3)	....
53.95 (40.23)	2128	3.684 (13.946)	0.478 (0.291)	14.64 (2.885)	180 (82.2)	63 (17.2)	77 (24.7)	....
Av 43.72 Av (32.61)	2131	3.394 (12.846)	0.544 (0.331)	12.88 (2.538)	180 (82.0)	63 (17.4)	75 (23.9)	28.87 (97.50)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 5th (1H) Gear											
68.49 (51.07)	4989 (22.19)	5.15 (8.29)	2000	6.77	5.084 (19.243)	0.520 (0.316)	13.47 (2.654)	188 (86.7)	55 (12.5)	64 (17.8)	29.14 (98.38)
75% of Pull at Maximum Power—Ten Hours 5th (1H) Gear											
56.42 (42.07)	3820 (16.99)	5.54 (8.91)	2100	4.30	4.294 (16.254)	0.533 (0.324)	13.14 (2.588)	188 (86.4)	64 (17.6)	75 (23.8)	28.72 (96.99)
50% of Pull at Maximum Power—Two Hours 5th (1H) Gear											
38.91 (29.02)	2547 (11.33)	5.73 (9.22)	2144	3.28	3.370 (12.757)	0.606 (0.369)	11.56 (2.275)	185 (85.0)	58 (14.2)	69 (20.6)	29.10 (98.25)
50% of Pull at Reduced Engine Speed—Two Hours 6th (2H) Gear											
38.91 (29.02)	2546 (11.33)	5.73 (9.22)	1450	2.99	2.613 (9.893)	0.470 (0.286)	14.89 (2.933)	185 (85.0)	60 (15.6)	72 (22.2)	29.03 (98.03)

MAXIMUM POWER IN SELECTED GEARS

41.72 (31.11)	8712 (38.75)	1.80 (2.89)	2127	14.68	2nd (2L) Gear	183 (83.9)	49 (9.4)	55 (12.8)	29.19 (98.57)
65.54 (48.88)	7672 (34.12)	3.20 (5.16)	1999	11.71	3rd (3L) Gear	185 (85.0)	50 (10.0)	58 (14.4)	29.18 (98.54)
67.64 (50.44)	6250 (27.80)	4.06 (6.53)	2000	8.97	4th (4L) Gear	186 (85.6)	52 (11.1)	60 (15.6)	29.17 (98.50)
69.74 (52.01)	5093 (22.65)	5.14 (8.26)	1998	6.94	5th (1H) Gear	187 (86.1)	53 (11.7)	63 (17.2)	29.16 (98.47)
69.38 (51.73)	3368 (14.98)	7.73 (12.43)	2001	4.74	6th (2H) Gear	187 (85.8)	53 (11.7)	62 (16.7)	29.17 (98.50)

LUGGING ABILITY IN 5th (1H) GEAR

Crankshaft Speed rpm	1998	1802	1600	1399	1198	997
Pull—lbs (kN)	5093 (22.65)	5405 (24.23)	5745 (25.73)	5887 (26.39)	5951 (26.67)	5878 (26.35)
Increase in Pull %	0	6	13	16	17	15
Power—Hp (kW)	69.74 (52.01)	66.33 (49.46)	62.27 (46.43)	55.64 (41.49)	48.09 (35.86)	39.57 (29.51)
Speed—Mph (km/h)	5.14 (8.26)	4.60 (7.41)	4.06 (6.54)	3.54 (5.70)	3.03 (4.88)	2.52 (4.06)
Slip %	6.94	7.47	8.13	8.25	8.30	8.26

Department of Agricultural Engineering

Dates of Test: May 16 to June 1, 1984

Manufacturer: MASSEY FERGUSON MANUFACTURING CO., P.O Box 62 Banner Lane, Coventry CV4 9GF Warwickshire, England

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8410 **Fuel weight** 7.003 lbs/gal *(0.839 kg/l)* **Oil SAE** 15W-40 **API service classification** SE, SF, CC, CD **To motor** 2.597 gal *(9.831 l)* **Drained from motor** 2.085 gal *(7.892 l)* **Transmission and final drive lubricant** Massey Ferguson Permatran III fluid **Total time engine was operated** 44.0 hours.

ENGINE: **Make** Perkins Diesel **Type** four cylinder vertical **Serial No.** ND31120U529075K **Crankshaft** lengthwise **Rated rpm** 2000 **Bore and stroke** 4.5" × 5" *(114.4 mm × 127 mm)* **Compression ratio** 17.5 to 1 **Displacement** 318 cu in *(5212 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper elements **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** standard **Serial No.** 703074 **Tread width** rear 60" *(1524 mm)* to 96" *(2438 mm)* front 57" *(1448 mm)* to 77" *(1956 mm)* **Wheel base** 96" *(2438 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 32.2" *(818 mm)* Vertical distance above roadway 33.0" *(838 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph** *(km/h)* first 1.4 *(2.2)* second 2.0 *(3.3)* third 3.7 *(6.0)* fourth 4.6 *(7.3)* fifth 5.7 *(9.1)* sixth 8.3 *(13.3)* seventh 15.2 *(24.5)* eighth 18.7 *(30.0)* reverse 1.9 *(3.0)*, 7.7 *(12.4)* **Clutch** single dry disc operated by foot pedal **Brakes** multiple wet disc hydraulically operated by two foot pedals which can be locked together and mechanically by hand lever **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 160" *(4.07 m)* left 163" *(4.14 m)* (on concrete surface without brake) right 192" *(4.87 m)* left 197" *(5.00 m)* **Turning space diameter** (on concrete surface with brake applied) right 328" *(8.34 m)* left 334" *(8.48 m)* (on concrete surface without brake) right 392" *(9.94 m)* left 402" *(10.20 m)* **Power take-off** 540 rpm at 1686 engine rpm and 1000 rpm at 1692 engine rpm.

REPAIRS and ADJUSTMENTS: During the preliminary PTO test, the No. 3 injector was found to be leaking. Test continued after the copper sealing washer under the injector cap was replaced.

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)
Maximum Available Power—Two Hours	100.0
75% of Pull at Maximum Power—Ten Hours	99.0
50% of Pull at Maximum Power—Two Hours	97.5
50% of Pull at Reduced Engine Speed—Two Hours	97.0
Bystander in 7th (3H) gear	90.0

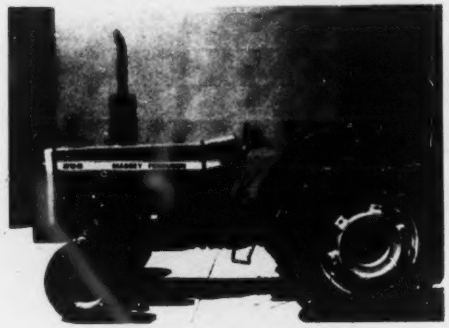
TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 18.4-34; 6; 16 *(110)*	Two 18.4-34; 6; 16 *(110)*
Ballast	—Liquid (each)	995 lb *(451 kg)*	None
	—Cast Iron (each)	495 lb *(225 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 9.5L-15; 6; 32 *(220)*	Two 9.5L-15; 6; 32 *(220)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	45 lb *(20 kg)*	None
Height of Drawbar		22.5 in *(570 mm)*	22.5 in *(570 mm)*
Static Weight with Operator	—Rear	8335 lb *(3781 kg)*	5355 lb *(2429 kg)*
	—Front	2705 lb *(1227 kg)*	2615 lb *(1186 kg)*
	—Total	11040 lb *(5008 kg)*	7970 lb *(3615 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 155°F *(68.3°C)*. Five gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1523**, July 3, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Massey Ferguson 298 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1524
MASSEY FERGUSON 298 MULTIPOWER DIESEL
12 SPEED

POWER TAKE-OFF PERFORMANCE

	Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours (PTO Speed—1182 rpm)									
	79.26 *(59.10)*	2000	5.419 *(20.511)*	0.479 *(0.291)*	14.63 *(2.881)*	185 *(85.2)*	66 *(19.1)*	75 *(24.0)*	28.99 *(97.88)*
Standard Power Take-off Speed (1000 rpm) — One hour)									
	74.25 *(55.37)*	1692	4.722 *(17.874)*	0.445 *(0.271)*	15.72 *(3.098)*	165 *(85.1)*	65 *(18.4)*	75 *(23.9)*	28.99 *(97.88)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
	69.91 *(52.13)*	2076	4.759 *(18.016)*	0.477 *(0.290)*	14.69 *(2.894)*	183 *(83.6)*	65 *(18.3)*	75 *(23.9)*	....
	0.00 *(0.00)*	2198	1.962 *(7.427)*	....	....	178 *(81.1)*	65 *(18.3)*	75 *(23.9)*	....
	36.29 *(27.06)*	2143	3.114 *(11.789)*	0.601 *(0.366)*	11.65 *(2.296)*	180 *(82.2)*	64 *(17.5)*	74 *(23.3)*	....
	78.98 *(58.89)*	2001	5.415 *(20.497)*	0.480 *(0.292)*	14.59 *(2.873)*	186 *(85.6)*	65 *(18.3)*	76 *(24.2)*	....
	18.35 *(13.69)*	2177	2.412 *(9.129)*	0.920 *(0.560)*	7.61 *(1.499)*	179 *(81.7)*	65 *(18.3)*	76 *(24.2)*	....
	53.31 *(39.75)*	2110	3.860 *(14.610)*	0.507 *(0.308)*	13.81 *(2.721)*	181 *(82.8)*	65 *(18.3)*	76 *(24.4)*	....
Av *Av*	**42.81** *(31.93)*	**2117**	**3.587** *(13.578)*	**0.587** *(0.357)*	**11.93** *(2.351)*	**181** *(82.8)*	**65** *(18.2)*	**75** *(24.0)*	**28.97** *(97.84)*

DRAWBAR PERFORMANCE

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 7th (1HL) Gear											
66.12 *(49.31)*	4835 *(21.50)*	5.13 *(8.26)*	2000	7.43	5.333 *(20.189)*	0.565 *(0.344)*	12.40 *(2.442)*	192 *(88.9)*	67 *(19.4)*	73 *(22.5)*	29.15 *(98.44)*
75% of Pull at Maximum Power—Ten Hours 7th (1HL) Gear											
54.27 *(40.47)*	3697 *(16.45)*	5.50 *(8.86)*	2088	4.88	4.380 *(16.578)*	0.565 *(0.344)*	12.39 *(2.441)*	190 *(87.6)*	66 *(18.7)*	73 *(22.8)*	28.66 *(96.78)*
50% of Pull at Maximum Power—Two Hours 7th (1HL) Gear											
37.50 *(27.96)*	2465 *(10.96)*	5.70 *(9.18)*	2130	3.34	3.477 *(13.162)*	0.649 *(0.395)*	10.79 *(2.125)*	188 *(86.7)*	72 *(22.2)*	76 *(24.4)*	29.09 *(98.23)*
50% of Pull at Reduced Engine Speed—Two Hours 9th (2HL) Gear											
37.50 *(27.97)*	2465 *(10.96)*	5.71 *(9.18)*	1450	3.23	2.613 *(9.892)*	0.488 *(0.297)*	14.35 *(2.827)*	187 *(85.8)*	73 *(22.5)*	76 *(24.4)*	29.03 *(98.01)*
MAXIMUM POWER IN SELECTED GEARS											
52.99 *(39.52)*	8663 *(38.53)*	2.29 *(3.69)*	2075	14.91	4th (2LH) Gear			188 *(86.7)*	56 *(13.3)*	64 *(17.8)*	28.73 *(97.02)*
63.35 *(47.24)*	7512 *(33.42)*	3.16 *(5.09)*	1999	13.15	5th (3LL) Gear			190 *(87.8)*	56 *(13.3)*	67 *(19.4)*	29.17 *(98.50)*
65.12 *(48.56)*	5630 *(25.04)*	4.34 *(6.98)*	2000	8.95	6th (3LH) Gear			191 *(88.3)*	57 *(13.9)*	68 *(20.0)*	29.17 *(98.50)*
67.44 *(50.29)*	4929 *(21.92)*	5.13 *(8.26)*	2000	7.40	7th (1HL) Gear			191 *(88.3)*	64 *(17.8)*	71 *(21.7)*	29.17 *(98.50)*
67.55 *(50.37)*	3700 *(16.46)*	6.85 *(11.02)*	2000	5.58	8th (1HH) Gear			191 *(88.3)*	59 *(15.0)*	69 *(20.6)*	29.17 *(98.50)*
67.85 *(50.60)*	3290 *(14.63)*	7.73 *(12.43)*	2000	4.89	9th (2HL) Gear			191 *(88.3)*	61 *(16.1)*	70 *(21.1)*	29.17 *(98.50)*

Department of Agricultural Engineering

Dates of Test: May 12-28, 1984

Manufacturer: MASSEY FERGUSON MANUFACTURING CO., P.O Box 62 Banner Lane, Coventry CV4 9GF Warwickshire, England

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8410 **Fuel weight** 7.003 lbs/gal *(0.839 kg/l)* **Oil SAE** 15W-40 **API service classification** SE, SF, CC, CD **To motor** 2.290 gal *(8.669 l)* **Drained from motor** 1.858 gal *(7.032 l)* **Transmission and final drive lubricant** Massey Ferguson Permatran III fluid **Total time engine was operated** 43.0 hours.

ENGINE: Make Perkins Diesel **Type** four cylinder vertical **Serial No.** ND31120U529059K **Crankshaft** lengthwise **Rated rpm** 2000 **Bore and stroke** 4.5" × 5" *(114.4 mm × 127 mm)* **Compression ratio** 17.5 to 1 **Displacement** 318 cu in *(5212 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper elements **Muffler** vertical **Cooling medium temperature control** one thermostat.

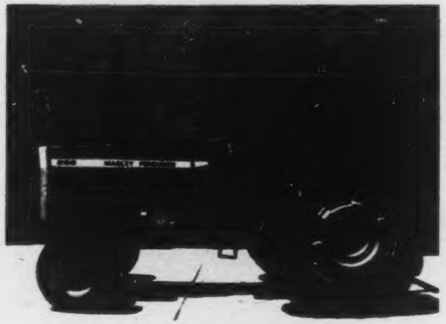
CHASSIS: Type standard **Serial No.** 703082 **Tread width** rear 60" *(1524 mm)* to 96" *(2438 mm)* front 57" *(1448 mm)* to 77" *(1956 mm)* **Wheel base** 96" *(2438 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 32.0" *(813 mm)* Vertical distance above roadway 33.0" *(838 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph** *(km/h)* first 1.4 *(2.3)* second 1.8 *(2.9)* third 2.1 *(3.3)* fourth 2.7 *(4.3)* fifth 3.7 *(6.0)* sixth 4.9 *(7.9)* seventh 5.7 *(9.2)* eighth 7.5 *(12.0)* ninth 8.4 *(13.5)* tenth 10.9 *(17.6)* eleventh 15.4 *(24.7)* twelfth 20.1 *(32.3)* reverse 1.9 *(3.1)*, 2.5 *(4.0)* 7.8 *(12.5)* 10.1 *(16.3)* **Clutch** single dry disc operated by foot pedal **Brakes** multiple wet disc hydraulically operated by two foot pedals which can be locked together and mechanically by hand **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 160" *(4.07 m)* left 163" *(4.14 m)* (on concrete surface without brake) right 192" *(4.87 m)* left 197" *(5.00 m)* **Turning space diameter** (on concrete surface with brake applied) right 328" *(8.34 m)* left 334" *(8.48 m)* (on concrete surface without brake) right 392" *(9.94 m)* left 402" *(10.20 m)* **Power take-off** 540 rpm at 1686 engine rpm and 1000 at 1692 engine rpm.

LUGGING ABILITY IN 7th (1HL) GEAR

Crankshaft Speed rpm	2000	1798	1605	1395	1195	998
Pull—lbs *(kN)*	4929 *(21.92)*	5344 *(23.95)*	5640 *(25.20)*	5810 *(26.04)*	5952 *(26.68)*	5914 *(26.51)*
Increase in Pull %	0	8	14	18	21	20
Power—Hp *(kW)*	67.44 *(50.29)*	65.14 *(48.58)*	60.97 *(45.47)*	54.41 *(40.57)*	47.56 *(35.47)*	39.48 *(29.44)*
Speed—Mph *(km/h)*	5.13 *(8.26)*	4.57 *(7.36)*	4.05 *(6.52)*	3.51 *(5.65)*	3.00 *(4.82)*	2.50 *(4.03)*
Slip %	7.40	8.31	8.83	9.21	9.46	9.46

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)
Maximum Available Power—Two Hours	99.5
75% of Pull at Maximum Power—Ten Hours	97.5
50% of Pull at Maximum Power—Two Hours	96.5
50% of Pull at Reduced Engine Speed—Two Hours	95.5
Bystander in 11th (3HL) gear	89.0

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 18.4-34; 6; 16 *(110)*	Two 18.4-34; 6; 16 *(110)*
Ballast	—Liquid (each)	1020 lb *(463 kg)*	None
	—Cast Iron (each)	410 lb *(186 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 9.5L-15; 6; 32 *(220)*	Two 9.5L-15; 6; 32 *(220)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	38 lb *(17 kg)*	None
Height of Drawbar		22.5 in *(570 mm)*	22.5 in *(570 mm)*
Static Weight with Operator	—Rear	8260 lb *(3747 kg)*	5400 lb *(2449 kg)*
	—Front	2690 lb *(1220 kg)*	2615 lb *(1186 kg)*
	—Total	10950 lb *(4967 kg)*	8015 lb *(3635 kg)*



Massey Ferguson 298 Multipower Diesel

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 163°F *(72.5°C)*. Six gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1524,** July 3, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1538—MASSEY FERGUSON 670 DIESEL ALSO MASSEY FERGUSON 270 MULTIPOWER DIESEL
12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1182 rpm)								
55.62 (41.48)	2001	3.579 (13.547)	0.449 (0.273)	15.54 (3.062)	187 (86.1)	63 (17.1)	75 (23.9)	28.60 (96.87)
Standard Power Take-off Speed (1000 rpm)—One Hour								
51.44 (38.36)	1692	3.136 (11.870)	0.426 (0.259)	16.39 (3.229)	187 (85.8)	62 (16.4)	75 (23.8)	28.60 (96.88)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
48.82 (36.41)	2062	3.230 (12.260)	0.463 (0.281)	15.07 (2.970)	182 (83.1)	63 (17.2)	75 (23.6)	......
0.00 (0.00)	2157	1.222 (4.624)	......	......	175 (79.4)	63 (17.2)	75 (23.6)	......
25.02 (18.66)	2115	2.146 (8.124)	0.599 (0.364)	11.66 (2.297)	176 (80.0)	64 (17.6)	76 (24.2)	......
56.02 (41.78)	2000	3.583 (13.562)	0.446 (0.271)	15.64 (3.080)	186 (85.6)	64 (17.6)	74 (23.3)	......
12.64 (9.42)	2136	1.675 (6.333)	0.924 (0.562)	7.55 (1.488)	176 (80.0)	64 (17.4)	74 (23.3)	......
37.02 (27.61)	2080	2.654 (10.045)	0.500 (0.304)	13.95 (2.748)	176 (80.0)	64 (17.5)	74 (23.3)	......
Av 29.92 Av (22.31)	2093	2.419 (9.158)	0.564 (0.343)	12.37 (2.436)	178 (81.3)	64 (17.5)	74 (23.4)	28.71 (96.94)

DRAWBAR PERFORMANCE (Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th (1LH) Gear											
45.52 (33.94)	3505 (15.59)	4.87 (7.84)	2002	6.44	3.520 (13.324)	0.539 (0.328)	12.93 (2.548)	185 (85.0)	61 (16.1)	75 (23.6)	28.83 (97.35)
75% of Pull at Maximum Power—Ten Hours 7th (1LH) Gear											
36.41 (27.15)	2657 (11.82)	5.14 (8.27)	2065	4.40	3.009 (11.392)	0.577 (0.351)	12.10 (2.383)	177 (80.5)	63 (17.1)	69 (20.8)	28.60 (96.87)
50% of Pull at Maximum Power—Two Hours 7th (1LH) Gear											
24.95 (18.59)	1772 (7.88)	5.27 (8.49)	2087	2.94	2.430 (9.196)	0.680 (0.414)	10.26 (2.021)	177 (80.3)	59 (14.7)	64 (17.5)	28.86 (97.46)
50% of Pull at Reduced Engine Speed—Two Hours 9th (2LH) Gear											
24.96 (18.61)	1771 (7.88)	5.28 (8.50)	1392	2.77	1.921 (7.272)	0.537 (0.327)	12.99 (2.558)	178 (81.1)	61 (16.1)	68 (19.7)	28.86 (97.46)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
36.16 (26.96)	6382 (28.39)	2.12 (3.41)	2060	14.81	4th (2HL) Gear	177 (80.6)	59 (15.0)	62 (16.7)	28.76 (97.12)
44.76 (33.39)	5422 (24.12)	3.10 (4.98)	1997	11.54	5th (3LL) Gear	180 (81.9)	60 (15.6)	66 (18.9)	28.80 (97.25)
45.56 (33.97)	4196 (18.66)	4.07 (6.55)	1990	8.11	6th (3HL) Gear	181 (82.5)	60 (15.6)	66 (18.9)	28.80 (97.25)
46.05 (34.34)	3543 (15.76)	4.87 (7.84)	2000	6.41	7th (1LH) Gear	184 (84.2)	60 (15.6)	72 (22.2)	28.84 (97.39)
45.70 (34.08)	2735 (12.17)	6.27 (10.08)	1990	4.77	8th (1HH) Gear	181 (82.8)	59 (15.0)	67 (19.4)	28.81 (97.29)
44.97 (33.53)	2250 (10.01)	7.49 (12.06)	2001	3.93	9th (2LH) Gear	181 (82.5)	59 (15.0)	68 (20.0)	28.82 (97.32)
43.92 (32.75)	1718 (7.64)	9.59 (15.43)	1990	3.00	10th (2HH) Gear	180 (81.9)	58 (14.4)	68 (20.0)	28.82 (97.32)

Department of Agricultural Engineering

Dates of Test: September 5-20, 1984

Manufacturer: MASSEY FERGUSON S.A. Avenue Blaise Pascal, 60026 Beauvais, France

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.8 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60°F** *(15/15°C)* 0.8377 **Fuel weight** 6.975 lbs/gal *(0.836 kg/l)* **Oil SAE** 15W-40 **API service classification** SE, CC, CD **To motor** 1.911 gal *(7.232 l)* **Drained from motor** 1.580 gal *(5.980 l)* **Transmission and final drive lubricant** Massey Ferguson Permatran III fluid **Total time engine was operated** 42.5 hours.

ENGINE: **Make** Perkins Diesel **Type** four cylinder vertical **Serial No.** LD31110U932519K **Crankshaft** lengthwise **Rated rpm** 2000 **Bore and stroke** 3.875" × 5.0" *(98.4 mm × 127 mm)* **Compression ratio** 16 to 1 **Displacement** 236 cu in *(3863 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** radiator for hydraulic and transmission oil, radiator for power steering fluid **Fuel filter** one paper element and sediment bowl **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** front wheel assist **Serial No.** △670RUK 323002△ **Tread width** rear 56" *(1422 mm)* to 90" *(2286 mm)* front 58" *(1484 mm)* to 70" *(1790 mm)* **Wheel base** 90" *(2286 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 34.1" *(867 mm)* Vertical distance above roadway 37.7" *(958 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph (km/h)** first 1.3 *(2.1)* second 1.6 *(2.6)* third 1.9 *(3.1)* fourth 2.4 *(3.9)* fifth 3.5 *(5.7)* sixth 4.5 *(7.2)* seventh 5.3 *(8.5)* eighth 6.7 *(10.7)* ninth 7.9 *(12.7)* tenth 10.0 *(16.1)* eleventh 14.5 *(23.3)* twelfth 18.3 *(29.5)* reverse 1.9 *(3.1)*, 2.4 *(3.9)*, 7.9 *(12.7)*, 10.0 *(16.1)* **Clutch** single dry disc operated by foot pedal **Brakes** multiple wet disc hydraulically operated by two foot pedals which can be locked together and mechanically by hand lever **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 165" *(4.19 m)* left 163" *(4.14 m)* (on concrete surface without brake) right 195" *(4.95 m)* left 192.5" *(4.89 m)* **Turning space diameter** (on concrete surface with brake applied) right 341" *(8.66 m)* left 337" *(8.56 m)* (on concrete surface without brake) right 401" *(10.19 m)* left 396" *(10.06 m)* **Power take-off** 540 rpm at 1686 engine rpm and 1000 rpm at 1692 engine rpm **Unladen tractor mass** 8545 lb *(3876 kg)*.

LUGGING ABILITY IN 7th (1LH) GEAR

Crankshaft Speed rpm	2000	1802	1604	1392	1195	985
Pull—lbs (kN)	3543 (15.76)	3801 (16.91)	4009 (17.83)	4223 (18.79)	4350 (19.35)	4241 (18.86)
Increase in Pull %	0	7	13	19	23	20
Power—Hp (kW)	46.05 (34.34)	44.27 (33.01)	41.26 (30.76)	37.55 (28.00)	33.12 (24.70)	26.84 (20.01)
Speed—Mph (km/h)	4.87 (7.84)	4.37 (7.03)	3.86 (6.21)	3.33 (5.36)	2.85 (4.59)	2.37 (3.82)
Slip %	6.41	6.78	7.51	8.11	8.35	8.11

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive Engaged dB(A)	Disengaged dB(A)
Maximum Available Power—Two Hours	79.5	80.5
75% of Pull at Maximum Power—Ten Hours		80.0
50% of Pull at Maximum Power—Two Hours		80.5
50% of Pull at Reduced Engine Speed—Two Hours		78.0
Bystander in 11th (3HL) gear		84.0

DRAWBAR PERFORMANCE (Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th (1LH) Gear											
46.28 (34.51)	3480 (15.38)	5.02 (8.08)	2001	4.45	3.534 (13.378)	0.553 (0.334)	13.10 (2.580)	187 (86.1)	62 (16.7)	78 (25.3)	28.82 (97.30)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
35.87 (26.75)	7966 (35.43)	1.69 (2.72)	2051	14.61	3rd (2LL) Gear	177 (80.6)	60 (15.6)	64 (17.8)	28.70 (97.19)
46.11 (34.38)	4105 (18.26)	4.21 (6.78)	1999	5.70	6th (3HL) Gear	181 (82.5)	60 (15.6)	67 (19.4)	28.81 (97.29)
47.13 (35.14)	3524 (15.67)	5.02 (8.07)	2000	4.42	7th (1LH) Gear	187 (86.1)	62 (16.7)	77 (25.0)	28.82 (97.32)

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 16.9-30; 6; 18 (125)	Two 16.9-30; 6; 18 (125)
Ballast	—Liquid (each)	200 lb (91 kg)	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi (kPa)	Two 11.2-24; 6; 26 (180)	Two 11.2-24; 6; 26 (180)
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	40 lb (18 kg)	None
Height of Drawbar		17 in (430 mm)	17 in (430 mm)
Static Weight with Operator	—Rear	5880 lb (2667 kg)	5480 lb (2485 kg)
	—Front	3320 lb (1506 kg)	3240 lb (1470 kg)
	—Total	9200 lb (4173 kg)	8720 lb (3955 kg)

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi *(kpa)*	3000	*20680*	
Location	trailer tipping connection		
Hydraulic oil temperature °F (°C)	178	*81*	
Location	sump		
	Maximum Lift Capacity		Lift Capacity for Transport
QUICK ATTACH	no		
CATEGORY	II		*not measured
LOAD lbs *(kg)*	3592	*1629*	
TIME sec	2.31		
HITCH POINT MOVEMENT in *(mm)*			
Lowest position	12.6	*321*	
Top of timed range	36.6	*930*	
Highest position	36.9	*937*	
LOAD CG MOVEMENT in *(mm)*			
Lowest position	11.9	*302*	
Top of timed range	40.2	*1021*	
Highest position	40.4	*1027*	

*Implement load capacity for transport purposes not specified by manufacturer.

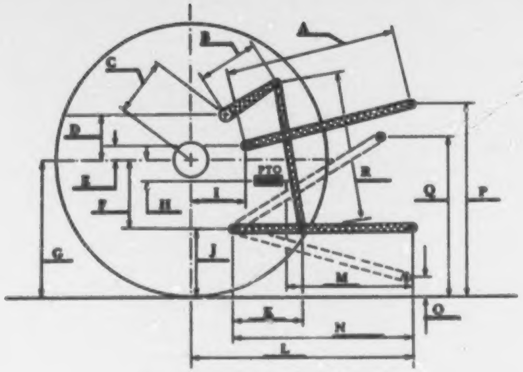
REPAIRS and ADJUSTMENTS: An auxiliary hydraulic valve gasket was replaced after the limber up run.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 146°F *(63.4°C)*. Seven gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1538, November 26, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Hitch Dimensions as Tested — No Load

	inch	mm
A	28.6	*726*
B	10.5	*267*
C	11.9	*302*
D	9.2	*234*
E	8.1	*206*
F	8.4	*213*
G	26.9	*683*
H	5.0	*127*
I	7.3	*185*
J	18.5	*470*
K	19.8	*503*
L	36.7	*933*
M	27.4	*696*
N	38.0	*965*
O	8.0	*203*
P	37.5	*953*
Q	33.0	*838*
R	26.3	*667*

Massey Ferguson 670 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1539—MASSEY FERGUSON 690 DIESEL 12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—627 rpm)								
65.68 (48.98)	2200	4.511 (17.075)	0.479 (0.291)	14.56 (2.868)	182 (83.3)	64 (17.7)	75 (23.9)	29.00 (97.93)
Standard Power Take-off Speed (540 rpm)—One Hour								
62.25 (46.42)	1893	4.012 (15.187)	0.450 (0.274)	15.51 (3.057)	184 (84.3)	63 (17.3)	75 (24.0)	29.00 (97.93)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
57.87 (43.15)	2281	3.991 (15.107)	0.481 (0.293)	14.50 (2.857)	176 (80.0)	63 (16.9)	75 (23.9)	......
0.00 (0.00)	2356	1.501 (5.681)	.....	.....	160 (71.1)	64 (17.8)	75 (23.6)	......
29.46 (21.97)	2323	2.565 (9.708)	0.607 (0.369)	11.49 (2.264)	164 (73.3)	65 (18.3)	75 (23.9)	......
66.21 (49.37)	2201	4.524 (17.125)	0.477 (0.290)	14.64 (2.883)	182 (83.1)	65 (18.3)	75 (23.9)	......
14.85 (11.08)	2342	1.931 (7.309)	0.907 (0.552)	7.69 (1.515)	163 (72.8)	65 (18.3)	75 (23.9)	......
43.85 (32.70)	2304	3.234 (12.241)	0.514 (0.313)	13.56 (2.671)	168 (75.6)	65 (18.3)	75 (23.9)	......
Av 35.37 Av (26.38)	2301	2.957 (11.194)	0.583 (0.355)	11.96 (2.356)	169 (76.0)	64 (18.0)	75 (23.8)	29.00 (97.93)

DRAWBAR PERFORMANCE (Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th (1LH) Gear											
53.36 (39.79)	4192 (18.65)	4.77 (7.68)	2200	6.47	4.444 (16.822)	0.581 (0.353)	12.01 (2.366)	182 (83.3)	67 (19.2)	76 (24.4)	28.73 (97.02)
75% of Pull at Maximum Power—Ten Hours 7th (1LH) Gear											
43.55 (32.47)	3230 (14.37)	5.06 (8.14)	2289	4.79	3.694 (13.984)	0.592 (0.360)	11.79 (2.322)	170 (76.4)	48 (8.7)	52 (11.3)	28.82 (97.32)
50% of Pull at Maximum Power—Two Hours 7th (1LH) Gear											
29.84 (22.25)	2155 (9.58)	5.20 (8.36)	2318	3.45	3.039 (11.504)	0.710 (0.432)	9.82 (1.934)	170 (76.4)	38 (3.6)	43 (6.1)	29.18 (98.54)
50% of Pull at Reduced Engine Speed—Two Hours 9th (2LH) Gear											
29.76 (22.19)	2153 (9.57)	5.18 (8.34)	1540	3.25	2.251 (8.519)	0.528 (0.321)	13.22 (2.605)	172 (77.5)	42 (5.5)	50 (9.7)	29.21 (98.62)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
43.09 (32.13)	7650 (34.03)	2.11 (3.40)	2278	14.65	4th (2HL) Gear	171 (76.9)	62 (16.7)	67 (19.4)	28.72 (96.98)
53.27 (39.72)	6538 (29.08)	3.06 (4.92)	2199	10.91	5th (3LL) Gear	179 (81.4)	63 (17.2)	68 (20.0)	28.72 (96.98)
53.54 (39.92)	4973 (22.12)	4.04 (6.50)	2200	7.83	6th (3HL) Gear	180 (82.2)	63 (17.2)	68 (20.0)	28.72 (96.98)
54.78 (40.85)	4306 (19.15)	4.77 (7.68)	2200	6.51	7th (1LH) Gear	180 (82.2)	65 (18.3)	70 (21.1)	28.73 (97.02)
53.19 (39.66)	3220 (14.32)	6.19 (9.97)	2190	4.87	8th (1HH) Gear	179 (81.7)	64 (17.8)	69 (20.6)	28.72 (96.98)
53.08 (39.58)	2711 (12.06)	7.34 (11.82)	2200	4.15	9th (2LH) Gear	179 (81.4)	64 (17.8)	69 (20.6)	28.73 (97.02)
50.25 (37.47)	1987 (8.84)	9.48 (15.26)	2201	3.04	10th (2HH) Gear	178 (81.1)	65 (18.3)	70 (21.1)	28.73 (97.02)

Department of Agricultural Engineering

Dates of Test: September 14-25, 1984

Manufacturer: MASSEY FERGUSON S.A. Avenue Blaise Pascal, 60026 Beauvais, France

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.8 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60° F** *(15/15°C)* 0.8378 **Fuel weight** 6.976 lbs/gal *(0.836 kg/l)* **Oil SAE** 15W-40 **API service classification** SE, CC, CD **To motor** 1.850 gal *(7.003 l)* **Drained from motor** 1.605 gal *(6.076 l)* **Transmission and final drive lubricant** Massey Ferguson Permatran III fluid **Total time engine was operated** 41.5 hours.

ENGINE: **Make** Perkins Diesel **Type** four cylinder vertical **Serial No.** LF31109U951357K **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** 3.975" × 5.0" *(101 mm × 127 mm)* **Compression ratio** 16 to 1 **Displacement** 248 cu in *(4065 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** radiator for hydraulic and transmission fluid, radiator for power steering fluid **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** front wheel assist **Serial No.** △690RU K325022△ **Tread width** rear 56" *(1422 mm)* to 90" *(2286 mm)* front 63" *(1598 mm)* to 71" *(1812 mm)* **Wheel base** 90" *(2286 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 40.2" *(1020 mm)* Vertical distance above roadway 38.5" *(978 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph** *(km/h)* first 1.2 *(2.0)* second 1.6 *(2.6)* third 1.9 *(3.0)* fourth 2.4 *(3.9)* fifth 3.5 *(5.6)* sixth 4.4 *(7.1)* seventh 5.2 *(8.3)* eighth 6.6 *(10.6)* ninth 7.7 *(12.4)* tenth 9.9 *(15.9)* eleventh 14.2 *(22.8)* twelfth 18.1 *(29.1)* reverse 1.9 *(3.0)*, 2.4 *(3.9)*, 7.7 *(12.4)*, 9.9 *(15.9)* **Clutch** single dry disc operated by foot pedal **Brakes** multiple wet disc hydraulically operated by two foot pedals which can be locked together and mechanically by hand lever **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 165.5" *(4.20 m)* left 165" *(4.19 m)* (on concrete surface without brake) right 194.5" *(4.94 m)* left 195" *(4.95 m)* **Turning space diameter** (on concrete surface with brake applied) right 345" *(8.76 m)* left 344" *(8.74 m)* (on concrete surface without brake) right 403" *(10.24 m)* left 404" *(10.26 m)* **Power take-off** 540 rpm at 1893 engine rpm and 1000 rpm at 1900 engine rpm **Unladen tractor mass** 7845 lb *(3558 kg)*.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

LUGGING ABILITY IN 7th (1LH) GEAR

Crankshaft Speed rpm	2200	1982	1756	1538	1313	1088	874
Pull—lbs (kN)	4306 (19.15)	4661 (20.73)	4960 (22.10)	5221 (23.22)	5436 (24.18)	5468 (24.32)	5256 (23.38)
Increase in Pull %	0	8	15	21	26	27	22
Power—Hp (kW)	54.78 (40.85)	53.09 (39.59)	49.87 (37.19)	45.64 (34.03)	40.39 (30.12)	33.85 (25.24)	25.98 (19.37)
Speed—Mph (km/h)	4.77 (7.68)	4.27 (6.87)	3.76 (6.06)	3.28 (5.28)	2.79 (4.48)	2.32 (3.74)	1.85 (2.98)
Slip %	6.51	7.27	7.52	8.15	8.52	8.64	8.27

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive Engaged dB(A)	Disengaged dB(A)
Maximum Available Power—Two Hours	80.5	81.0
75% of Pull at Maximum Power—Ten Hours		80.0
50% of Pull at Maximum Power—Two Hours		81.0
50% of Pull at Reduced Engine Speed—Two Hours		77.0
Bystander in 12th (3HH) gear		86.5

DRAWBAR PERFORMANCE (Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th (1LH) Gear											
52.38 (39.06)	3960 (17.61)	4.96 (7.98)	2200	4.87	4.437 (16.795)	0.591 (0.359)	11.81 (2.326)	183 (83.9)	67 (19.4)	77 (24.7)	28.73 (97.02)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
42.54 (31.72)	9437 (41.98)	1.69 (2.72)	2284	14.70	3rd (2LL) Gear	169 (76.1)	61 (16.1)	66 (18.9)	28.71 (96.95)
52.92 (39.46)	4008 (17.83)	4.95 (7.97)	2199	5.08	7th (1LH) Gear	180 (81.9)	65 (18.3)	70 (21.1)	28.73 (97.02)

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 18.4-30; 6; 16 *(110)*	Two 18.4-30; 6; 16 *(110)*
Ballast	—Liquid (each)	1090 lb *(494 kg)*	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi (kPa)	Two 13.6-24; 6; 22 *(150)*	Two 13.6-24; 6; 22 *(150)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	47 lb *(22 kg)*	None
Height of Drawbar		17 in *(430 mm)*	17 in *(430 mm)*
Static Weight with Operator	—Rear	6700 lb *(3039 kg)*	4520 lb *(2050 kg)*
	—Front	3595 lb *(1631 kg)*	3500 lb *(1588 kg)*
	—Total	10295 lb *(4670 kg)*	8020 lb *(3638 kg)*

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi (bar)	3100	*21370*	
Location	trailer tipping connection		
Hydraulic oil temperature °F (°C)	189	*87*	
Location	sump		
	Maximum Lift Capacity		Lift Capacity for Transport
QUICK ATTACH	no		
CATEGORY	II		*not measured
LOAD lbs (kg)	3598	*1632*	
TIME sec	2.02		
HITCH POINT MOVEMENT in (mm)			
Lowest position	12.6	*321*	
Top of timed range	36.6	*930*	
Highest position	37.1	*943*	
LOAD CG MOVEMENT in (mm)			
Lowest position	11.6	*295*	
Top of timed range	40.6	*1032*	
Highest position	41.1	*1043*	

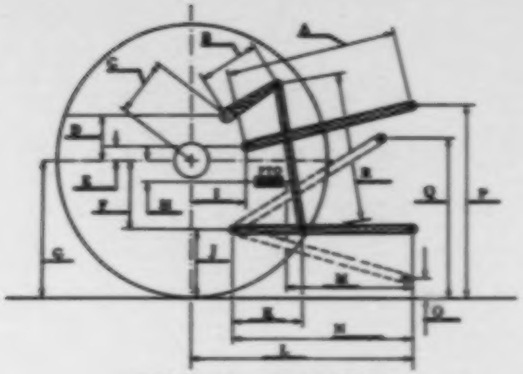
*Implement load capacity for transport purposes not specified by manufacturer.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 155°F *(67.0°C)*. Seven gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1539, December 3, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Hitch Dimensions as Tested — No Load

	inch	mm
A	29.5	749
B	10.5	267
C	11.9	302
D	8.3	211
E	7.2	183
F	9.3	236
G	27.6	701
H	5.9	150
I	7.3	185
J	18.3	465
K	19.8	503
L	36.8	933
M	27.4	696
N	38.0	965
O	8.0	203
P	37.3	947
Q	34.5	876
R	26.4	671

Massey Ferguson 690 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1540—MASSEY FERGUSON 698 DIESEL 12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—640 rpm)								
78.83 (58.79)	2000	5.340 (20.212)	0.472 (0.287)	14.76 (2.908)	184 (84.7)	61 (16.2)	75 (23.9)	29.19 (98.57)
Standard Power Take-off Speed (540 rpm)—One Hour								
74.41 (55.49)	1687	4.677 (17.704)	0.438 (0.267)	15.91 (3.134)	184 (84.4)	62 (16.5)	75 (23.9)	29.22 (98.67)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
70.34 (52.45)	2100	4.884 (18.487)	0.484 (0.294)	14.40 (2.837)	183 (83.9)	62 (16.7)	75 (23.6)	......
0.00 (0.00)	2150	1.936 (7.330)	.....	.....	179 (81.7)	61 (16.1)	75 (23.4)	......
35.40 (26.40)	2113	3.042 (11.516)	0.599 (0.364)	11.64 (2.293)	180 (82.2)	62 (16.4)	75 (23.6)	......
79.34 (59.17)	2000	5.327 (20.164)	0.468 (0.285)	14.89 (2.934)	185 (85.0)	61 (16.1)	75 (23.9)	......
17.84 (13.30)	2133	2.425 (9.170)	0.947 (0.576)	7.36 (1.451)	179 (81.7)	61 (16.1)	75 (23.6)	......
52.86 (39.42)	2106	3.877 (14.675)	0.511 (0.311)	13.63 (2.686)	181 (82.8)	61 (16.1)	76 (24.2)	......
Av 42.84 Av (31.95)	2100	3.581 (13.557)	0.583 (0.356)	11.91 (2.345)	181 (82.9)	61 (16.3)	75 (23.8)	29.25 (98.76)

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th (1LH) Gear											
66.72 (49.75)	5470 (24.33)	4.57 (7.36)	2000	6.86	5.314 (20.116)	0.555 (0.338)	12.55 (2.473)	185 (85.0)	61 (15.8)	68 (19.7)	29.12 (98.33)
75% of Pull at Maximum Power—Ten Hours 7th (1LH) Gear											
55.20 (41.16)	4219 (18.77)	4.91 (7.90)	2105	5.10	4.511 (17.076)	0.570 (0.347)	12.24 (2.411)	184 (84.6)	59 (14.7)	68 (20.1)	29.12 (98.32)
50% of Pull at Maximum Power—Two Hours 7th (1LH) Gear											
37.98 (28.32)	2814 (12.52)	5.06 (8.15)	2132	3.36	3.586 (13.574)	0.658 (0.400)	10.59 (2.087)	183 (83.9)	51 (10.3)	66 (18.9)	29.28 (98.87)
50% of Pull at Reduced Engine Speed—Two Hours 9th (2LH) Gear											
37.92 (28.28)	2813 (12.51)	5.05 (8.13)	1414	2.96	2.575 (9.746)	0.473 (0.288)	14.73 (2.901)	184 (84.2)	69 (20.3)	86 (30.0)	29.05 (98.08)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
48.12 (35.88)	8707 (38.73)	2.07 (3.34)	2113	14.73	4th (2HL) Gear	183 (83.9)	55 (12.8)	57 (13.9)	29.11 (98.30)
63.86 (47.62)	8333 (37.07)	2.87 (4.62)	1999	12.88	5th (3LL) Gear	185 (85.0)	56 (13.3)	59 (15.0)	29.12 (98.33)
66.38 (49.50)	6484 (28.84)	3.84 (6.18)	2000	8.95	6th (3HL) Gear	185 (85.0)	50 (10.0)	65 (18.3)	29.35 (99.11)
68.38 (50.99)	5625 (25.02)	4.56 (7.34)	2001	7.23	7th (1LH) Gear	186 (85.3)	51 (10.6)	67 (19.4)	29.31 (98.98)
67.78 (50.55)	4279 (19.03)	5.94 (9.56)	2000	5.17	8th (1HH) Gear	185 (85.0)	51 (10.6)	66 (18.9)	29.34 (99.08)
67.91 (50.64)	3619 (16.10)	7.04 (11.33)	1999	4.54	9th (2LH) Gear	185 (85.0)	50 (10.0)	65 (18.3)	29.35 (99.11)
66.03 (49.24)	2725 (12.11)	9.09 (14.64)	2001	3.52	10th (2HH) Gear	186 (85.3)	51 (10.6)	66 (18.9)	29.34 (99.08)

Department of Agricultural Engineering

Dates of Test: September 11-19, 1984

Manufacturer: MASSEY FERGUSON S.A. Avenue Blaise Pascal, 60026 Beauvais, France

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.8 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60°F** *(15/15°C)* 0.8574 **Fuel weight** 6.972 lbs/gal *(0.836 kg/l)* **Oil SAE** 15W-40 **API service classification** SE, CC, CD **To motor** 2.558 gal *(9.684 l)* **Drained from motor** 2.195 gal *(8.310 l)* **Transmission and final drive lubricant** Massey Ferguson Permatran III fluid **Total time engine was operated** 39.5 hours.

ENGINE: **Make** Perkins Diesel **Type** four cylinder vertical **Serial No.** ND31118U?27784K **Crankshaft** lengthwise **Rated rpm** 2000 **Bore and stroke** 4.5" × 5.0" *(114.4 mm × 127 mm)* **Compression ratio** 17.5 to 1 **Displacement** 318 cu in *(5212 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil, radiator for power steering fluid **Fuel filter** two paper elements **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** front wheel assist **Serial No.** △698RUK250050△ **Tread width** rear 60" *(1524 mm)* to 96" *(2438 mm)* front 66" *(1682 mm)* to 74" *(1886 mm)* **Wheel base** 96" *(2438 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 36.2" *(920 mm)* Vertical distance above roadway 41.5" *(1054 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph** *(km/h)* first 1.2 *(2.0)* second 1.6 *(2.5)* third 1.8 *(3.0)* fourth 2.3 *(3.7)* fifth 3.4 *(5.4)* sixth 4.3 *(6.9)* seventh 5.0 *(8.1)* eighth 6.4 *(10.3)* ninth 7.5 *(12.1)* tenth 9.6 *(15.5)* eleventh 13.8 *(22.2)* twelfth 17.6 *(28.3)* reverse 1.8 *(2.9)*, 2.3 *(3.7)*, 7.5 *(12.1)*, 9.6 *(15.5)* **Clutch** single dry disc operated by foot pedal **Brakes** multiple wet disc hydraulically operated by two foot pedals which can be locked together and mechanically by hand lever **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 170.5" *(4.33 m)* left 173" *(4.39 m)* (on concrete surface without brake) right 199.5" *(5.07 m)* left 203" *(5.16 m)* **Turning space diameter** (on concrete surface with brake applied) right 356" *(9.04 m)* left 361" *(9.17 m)* (on concrete surface without brake) right 414" *(10.52 m)* left 421" *(10.69 m)* **Power take-off** 540 rpm at 1687 engine rpm and 1000 rpm at 1692 engine rpm **Unladen tractor mass** 9770 lb *(4432 kg)*.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

LUGGING ABILITY IN 7th (1LH) GEAR

Crankshaft Speed rpm	2001	1800	1607	1399	1194	994
Pull—lbs (kN)	5625 (25.02)	6077 (27.03)	6436 (28.63)	6672 (29.68)	6868 (30.55)	6769 (30.11)
Increase in Pull %	0	8	14	19	22	20
Power—Hp (kW)	68.38 (50.99)	65.91 (49.15)	61.85 (46.12)	55.46 (41.35)	48.38 (36.08)	39.81 (29.69)
Speed—Mph (km/h)	4.56 (7.34)	4.07 (6.55)	3.60 (5.80)	3.12 (5.02)	2.64 (4.25)	2.21 (3.55)
Slip %	7.23	7.89	8.81	9.32	9.95	9.70

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive Engaged dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	82.5	82.5
75% of Pull at Maximum Power—Ten Hours		81.5
50% of Pull at Maximum Power—Two Hours		81.0
50% of Pull at Reduced Engine Speed—Two Hours		79.5
Bystander in 12th (3HH) gear		87.5

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th (1LH) Gear											
65.83 (49.09)	5214 (23.19)	4.73 (7.62)	2000	5.28	5.300 (20.062)	0.561 (0.341)	12.42 (2.447)	187 (85.8)	66 (18.6)	79 (26.1)	29.09 (98.22)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
59.34 (44.25)	10758 (47.85)	2.07 (3.33)	2081	14.85	4th (2HL) Gear	184 (84.4)	54 (12.2)	56 (13.3)	29.11 (98.30)
67.90 (50.63)	5400 (24.02)	4.72 (7.59)	2000	5.57	7th (1LH) Gear	186 (85.3)	51 (10.6)	67 (19.4)	29.32 (99.01)

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 18.4-34; 6; 16 (110)	Two 18.4-34; 6; 16 (110)
Ballast	—Liquid (each)	1050 lb (476 kg)	None
	—Cast iron (each)	None	None
Front Tires	—No., size, ply & psi (kPa)	Two 14.9-24; 6; 20 (140)	Two 14.9-24; 6; 20 (140)
Ballast	—Liquid (each)	None	None
	—Cast iron (each)	43 lb (19 kg)	None
Height of Drawbar		17 in (430 mm)	17 in (430 mm)
Static Weight with Operator	—Rear	8350 lb (3788 kg)	6250 lb (2835 kg)
	—Front	3775 lb (1712 kg)	3690 lb (1674 kg)
	—Total	12125 lb (5500 kg)	9940 lb (4509 kg)

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi *(kpa)*	3100	*21370*	
Location	trailer tipping connection		
Hydraulic oil temperature °F (°C)	187	*86*	
Location	sump		
	Maximum Lift Capacity		Lift Capacity for Transport
QUICK ATTACH	no		
CATEGORY	II		*not measured
LOAD lbs *(kg)*	4428	*2009*	
TIME sec	6.61		
HITCH POINT MOVEMENT in *(mm)*			
Lowest position	13.1	*333*	
Top of timed range	37.1	*943*	
Highest position	38.3	*972*	
LOAD CG MOVEMENT in *(mm)*			
Lowest position	12.1	*306*	
Top of timed range	39.4	*1002*	
Highest position	41.1	*1045*	

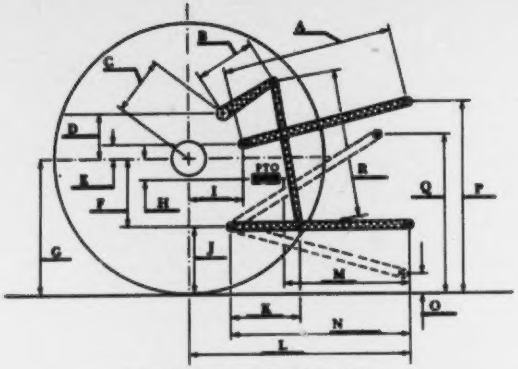
*Implement load capacity for transport purposes not specified by manufacturer.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 137°F *(58.1°C)*. Seven gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1540, December 3, 1984.

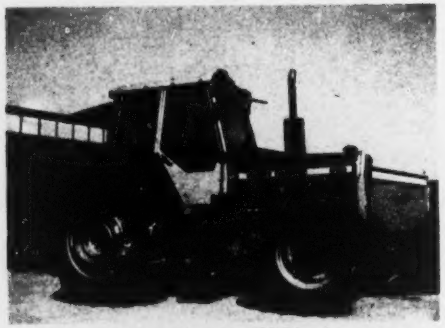
LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Hitch Dimensions as Tested — No Load

	inch	mm
A	31.4	*797*
B	10.5	*267*
C	11.9	*302*
D	9.2	*234*
E	8.1	*206*
F	8.4	*213*
G	29.2	*740*
H	5.0	*127*
I	7.3	*185*
J	20.8	*527*
K	21.5	*546*
L	38.8	*984*
M	23.4	*594*
N	40.0	*1016*
O	8.0	*203*
P	39.8	*1010*
Q	33.1	*841*
R	27.8	*705*



Massey Ferguson 698 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1541—MASSEY FERGUSON 699 DIESEL 12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—627 rpm)								
85.79 *(63.98)*	2200	5.346 *(20.233)*	0.434 *(0.264)*	16.05 *(3.162)*	178 *(81.1)*	64 *(17.8)*	75 *(24.1)*	29.00 *(97.93)*
Standard Power Take-off Speed (540 rpm)—One Hour								
78.00 *(58.17)*	1894	4.598 *(17.405)*	0.411 *(0.250)*	16.96 *(3.342)*	177 *(80.5)*	65 *(18.3)*	74 *(23.4)*	29.02 *(98.00)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
76.19 *(56.81)*	2299	4.875 *(18.454)*	0.446 *(0.271)*	15.63 *(3.079)*	176 *(80.0)*	69 *(20.3)*	79 *(26.1)*	....
0.00 *(0.00)*	2389	1.812 *(6.857)*	....	....	171 *(76.9)*	64 *(17.8)*	76 *(24.2)*	....
38.75 *(28.90)*	2337	3.197 *(12.102)*	0.575 *(0.350)*	12.12 *(2.388)*	172 *(77.8)*	64 *(17.8)*	75 *(23.6)*	....
85.71 *(63.91)*	2201	5.336 *(20.197)*	0.434 *(0.264)*	16.06 *(3.164)*	178 *(81.1)*	67 *(19.2)*	78 *(25.3)*	....
19.58 *(14.60)*	2364	2.380 *(9.007)*	0.847 *(0.515)*	8.23 *(1.621)*	172 *(77.5)*	66 *(18.9)*	76 *(24.2)*	....
57.50 *(42.88)*	2313	3.989 *(15.099)*	0.484 *(0.294)*	14.42 *(2.840)*	174 *(78.6)*	65 *(18.1)*	76 *(24.4)*	....
Av 46.29 *Av* *(34.52)*	2317	3.598 *(13.619)*	0.542 *(0.330)*	12.87 *(2.534)*	174 *(78.7)*	66 *(18.9)*	76 *(24.6)*	29.03 *(98.01)*

DRAWBAR PERFORMANCE (Front Wheel Drive Disengaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 7th (1LH) Gear											
70.52 *(52.59)*	5632 *(25.05)*	4.70 *(7.56)*	2199	7.42	5.221 *(19.763)*	0.516 *(0.314)*	13.51 *(2.661)*	174 *(78.9)*	40 *(4.2)*	49 *(9.2)*	29.33 *(99.03)*
75% of Pull at Maximum Power—Ten Hours 7th (1LH) Gear											
57.76 *(43.07)*	4296 *(19.11)*	5.04 *(8.11)*	2311	5.34	4.563 *(17.271)*	0.551 *(0.335)*	12.66 *(2.494)*	174 *(78.7)*	45 *(7.1)*	50 *(9.7)*	29.20 *(98.59)*
50% of Pull at Maximum Power—Two Hours 7th (1LH) Gear											
39.59 *(29.52)*	2864 *(12.74)*	5.18 *(8.34)*	2335	3.78	3.722 *(14.089)*	0.655 *(0.399)*	10.64 *(2.095)*	172 *(77.8)*	38 *(3.1)*	44 *(6.4)*	29.43 *(99.38)*
50% of Pull at Reduced Engine Speed—Two Hours 9th (2LH) Gear											
39.62 *(29.54)*	2865 *(12.74)*	5.19 *(8.35)*	1558	3.68	2.869 *(10.859)*	0.505 *(0.307)*	13.81 *(2.720)*	172 *(77.8)*	40 *(4.2)*	50 *(9.7)*	29.42 *(99.33)*
MAXIMUM POWER IN SELECTED GEARS											
50.64 *(37.76)*	8718 *(38.78)*	2.18 *(3.51)*	2307	12.22	4th (2HL) Gear			173 *(78.1)*	38 *(3.3)*	45 *(7.2)*	29.42 *(99.35)*
68.83 *(51.33)*	8606 *(38.28)*	3.00 *(4.83)*	2201	12.10	5th (3LL) Gear			174 *(78.6)*	38 *(3.3)*	45 *(7.2)*	29.42 *(99.35)*
69.41 *(51.76)*	6571 *(29.23)*	3.96 *(6.38)*	2200	8.70	6th (3HL) Gear			174 *(78.9)*	39 *(3.9)*	48 *(8.9)*	29.38 *(99.21)*
71.71 *(53.47)*	5728 *(25.48)*	4.69 *(7.56)*	2200	7.52	7th (1LH) Gear			174 *(78.9)*	40 *(4.4)*	49 *(9.4)*	29.31 *(98.98)*
69.57 *(51.88)*	4286 *(19.06)*	6.09 *(9.80)*	2199	5.78	8th (1HH) Gear			174 *(78.9)*	39 *(3.9)*	48 *(8.9)*	29.38 *(99.21)*
69.76 *(52.02)*	3612 *(16.07)*	7.24 *(11.66)*	2200	4.88	9th (2LH) Gear			174 *(78.9)*	39 *(3.9)*	48 *(8.9)*	29.36 *(99.14)*
66.45 *(49.55)*	2673 *(11.89)*	9.32 *(15.01)*	2201	3.82	10th (2HH) Gear			174 *(78.9)*	39 *(3.9)*	48 *(8.9)*	29.36 *(99.14)*

Department of Agricultural Engineering

Dates of Test: September 6-28, 1984

Manufacturer: MASSEY FERGUSON S.A. Avenue Blaise Pascal, 60026 Beauvais, France

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.8 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60°F** *(15/15°C)* 0.8374 **Fuel weight** 6.972 lbs/gal *(0.836 kg/l)* **Oil SAE** 15W-40 **API service classification** SE, SF, CC, CD **To motor** 3.626 gal *(13.727 l)* **Drained from motor** 3.247 gal *(12.293 l)* **Transmission and final drive lubricant** Massey Ferguson Permatran III fluid **Total time engine was operated** 51.5 hours.

ENGINE: **Make** Perkins Diesel **Type** six cylinder vertical **Serial No.** TWU708782K **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** 3.875" × 5.0" *(98.4 mm × 127 mm)* **Compression ratio** 16.0 to 1 **Displacement** 354 cu in *(5802 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and centrifugal precleaner **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil, radiator for power steering fluid **Fuel filter** two paper elements **Muffler** vertical **Cooling medium temperature control** two thermostats.

CHASSIS: **Type** front wheel assist **Serial No.** △699RUT105043△ **Tread width** rear 60" *(1524 mm)* to 96" *(2438 mm)* front 66" *(1682 mm)* to 74" *(1886 mm)* **Wheel base** 101.4" *(2576 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 39.0" *(990 mm)* Vertical distance above roadway 41.5" *(1054 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph** *(km/h)* first 1.2 *(2.0)* second 1.6 *(2.5)* third 1.8 *(2.9)* fourth 2.3 *(3.7)* fifth 3.4 *(5.4)* sixth 4.3 *(6.9)* seventh 5.0 *(8.0)* eighth 6.4 *(10.2)* ninth 7.5 *(12.1)* tenth 9.5 *(15.3)* eleventh 13.8 *(22.1)* twelfth 17.5 *(28.2)* reverse 1.8 *(2.9)*, 2.3 *(3.7)*, 7.5 *(12.1)*, 9.5 *(15.3)* **Clutch** single dry disc operated by foot pedal **Brakes** multiple wet disc hydraulically operated by two foot pedals which can be locked together and mechanically by hand lever **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 180.5" *(4.58 m)* left 183" *(4.65 m)* (on concrete surface without brake) right 208.5" *(5.30 m)* left 213.5" *(5.42 m)* **Turning space diameter** (on concrete surface with brake applied) right 376" *(9.55 m)* left 381" *(9.68 m)* (on concrete surface without brake) right 432" *(10.97 m)* left 442" *(11.23 m)* **Power take-off** 540 rpm at 1894 engine rpm and 1000 rpm at 1900 engine rpm **Unladen tractor mass** 10150 lb *(4604 kg)*.

LUGGING AB[illegible] IN 7th (1LH) GEAR

Crankshaft Speed rpm	2200	1981	1755	1542	1318	1094
Pull—lbs *(kN)*	5728 *(25.48)*	5950 *(26.47)*	6179 *(27.49)*	6315 *(28.09)*	6519 *(29.00)*	6386 *(28.41)*
Increase in Pull %	0	4	8	10	14	11
Power—Hp *(kW)*	71.71 *(53.47)*	66.81 *(49.82)*	61.27 *(45.69)*	54.90 *(40.94)*	48.29 *(36.01)*	39.35 *(29.34)*
Speed—Mph *(km/h)*	4.69 *(7.56)*	4.21 *(6.78)*	3.72 *(5.98)*	3.26 *(5.25)*	2.78 *(4.47)*	2.31 *(3.72)*
Slip %	7.52	7.66	8.05	8.31	8.57	8.44

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive Engaged dB(A)	Disengaged dB(A)
Maximum Available Power—Two Hours	82.0	81.5
75% of Pull at Maximum Power—Ten Hours		82.5
50% of Pull at Maximum Power—Two Hours		82.5
50% of Pull at Reduced Engine Speed—Two Hours		79.5
Bystander in 12th (3HH) gear		88.5

DRAWBAR PERFORMANCE (Front Wheel Drive Engaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 7th (1LH) Gear											
69.33 *(51.70)*	5328 *(23.70)*	4.88 *(7.85)*	2200	5.75	5.207 *(19.709)*	0.524 *(0.318)*	13.32 *(2.623)*	175 *(79.2)*	40 *(4.4)*	49 *(9.4)*	29.28 *(98.87)*
MAXIMUM POWER IN SELECTED GEARS											
65.81 *(49.08)*	11620 *(51.69)*	2.12 *(3.42)*	2275	14.91	4th (2HL) Gear			175 *(78.3)*	38 *(3.3)*	45 *(7.2)*	29.42 *(99.35)*
70.36 *(52.47)*	5405 *(24.03)*	4.88 *(7.86)*	2201	5.82	7th (1LH) Gear			175 *(79.4)*	40 *(4.4)*	49 *(9.4)*	29.30 *(98.94)*

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 18.4-34; 6; 16 *(110)*	Two 18.4-34; 6; 16 *(110)*
Ballast	—Liquid (each)	1050 lb *(476 kg)*	None
	—Cast Iron (each)	210 lb *(95 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 14.9-24; 6; 20 *(140)*	Two 14.9-24; 6; 20 *(140)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	45 lb *(21 kg)*	None
Height of Drawbar		17 in *(430 mm)*	17 in *(430 mm)*
Static Weight with Operator	—Rear	8945 lb *(4057 kg)*	6425 lb *(2914 kg)*
	—Front	3990 lb *(1810 kg)*	3900 lb *(1769 kg)*
	—Total	12935 lb *(5867 kg)*	10325 lb *(4683 kg)*

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi *(kpa)*	3100	*21370*	
Location	trailer tipping connection		
Hydraulic oil temperature °F (°C)	195	*89*	
Location	sump		
	Maximum Lift Capacity		Lift Capacity for Transport
QUICK ATTACH	no		
CATEGORY	II		*not measured
LOAD lbs *(kg)*	5212	*2364*	
TIME sec	5.05		
HITCH POINT MOVEMENT in *(mm)*			
Lowest position	12.6	*321*	
Top of timed range	36.8	*933*	
Highest position	37.4	*949*	
LOAD CG MOVEMENT in *(mm)*			
Lowest position	11.2	*284*	
Top of timed range	39.0	*991*	
Highest position	39.8	*1011*	

*Implement load capacity for transport purposes not specified by manufacturer.

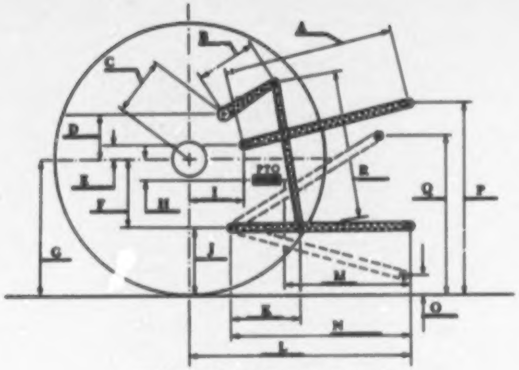
REPAIRS and ADJUSTMENTS: No repairs or adjustments.

·**REMARKS:** All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 151°F *(66.4°C)*. Seven gears were chosen between tire tangential pull limit and 15% slip. During the warmup on the drawbar, a wrong gear ratio was discovered. The gear set was replaced and tests continued.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1541, December 3, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Hitch Dimensions as Tested — No Load

	inch	mm
A	31.8	806
B	10.5	267
C	11.9	302
D	9.2	234
E	8.1	206
F	8.4	213
G	28.8	731
H	5.0	127
I	7.3	185
J	20.4	518
K	21.5	546
L	38.8	984
M	23.4	594
N	40.0	1016
O	8.0	203
P	39.4	1000
Q	33.5	851
R	27.8	705

Massey Ferguson 699 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1511
MASSEY FERGUSON 3505 DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank-shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1148 rpm)								
91.30 (68.08)	2400	6.398 (24.218)	0.490 (0.298)	14.30 (2.818)	185 (85.0)	57 (13.8)	75 (23.8)	28.84 (97.40)
Standard Power Take-off Speed (1000 rpm)—One Hour								
87.47 (65.22)	2091	5.632 (21.317)	0.451 (0.274)	15.53 (3.060)	185 (85.0)	57 (13.9)	75 (23.9)	28.83 (97.35)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
81.29 (60.62)	2509	5.832 (22.076)	0.502 (0.306)	13.94 (2.746)	183 (83.6)	57 (13.9)	75 (23.9)	......
0.00 (0.00)	2617	2.168 (8.208)	......	......	174 (78.9)	57 (13.6)	74 (23.3)	......
41.02 (30.59)	2571	3.882 (14.696)	0.663 (0.397)	10.72 (2.112)	177 (80.6)	58 (14.2)	74 (23.3)	......
92.18 (68.74)	2399	6.436 (24.363)	0.489 (0.297)	14.32 (2.821)	185 (85.0)	58 (14.4)	74 (23.3)	......
21.05 (15.68)	2596	3.047 (11.535)	1.014 (0.617)	6.90 (1.360)	175 (79.4)	59 (15.0)	76 (24.4)	......
61.71 (46.02)	2539	4.761 (18.021)	0.540 (0.329)	12.96 (2.554)	179 (81.7)	59 (15.0)	76 (24.4)	......
Av 49.54 Av (36.94)	2538	4.354 (16.483)	0.614 (0.374)	11.38 (2.242)	179 (81.5)	58 (14.4)	75 (23.8)	28.84 (97.39)

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 10th (5H) Gear											
73.43 (54.76)	4886 (21.73)	5.64 (9.07)	2400	6.60	6.356 (24.061)	0.606 (0.369)	11.55 (2.276)	188 (86.4)	53 (11.6)	64 (17.5)	28.69 (96.80)
75% of Pull at Maximum Power—Ten Hours 10th (5H) Gear											
59.72 (44.53)	3707 (16.49)	6.04 (9.72)	2519	4.58	5.479 (20.741)	0.642 (0.391)	10.90 (2.147)	186 (85.6)	57 (14.1)	69 (20.5)	28.40 (95.92)
50% of Pull at Maximum Power—Two Hours 10th (5H) Gear											
40.96 (30.55)	2471 (10.99)	6.22 (10.00)	2553	3.19	4.457 (16.870)	0.762 (0.463)	9.19 (1.811)	184 (84.2)	67 (19.2)	76 (24.2)	28.30 (95.55)
50% of Pull at Reduced Engine Speed—Two Hours 15th (7L) Gear											
40.96 (30.54)	2471 (10.99)	6.22 (10.00)	1585	2.97	3.192 (12.083)	0.546 (0.332)	12.83 (2.527)	185 (84.7)	67 (19.4)	80 (26.4)	28.29 (95.51)
MAXIMUM POWER IN SELECTED GEARS											
55.84 (41.64)	8344 (37.11)	2.51 (4.04)	2522	14.82	5th (3L) Gear			184 (84.4)	65 (18.3)	70 (21.1)	28.30 (95.56)
69.39 (51.75)	8109 (36.07)	3.21 (5.16)	2398	14.08	6th (3H) Gear			188 (86.4)	62 (16.7)	69 (20.6)	28.30 (95.56)
71.41 (53.25)	7999 (35.58)	3.35 (5.39)	2397	13.83	7th (4L) Gear			189 (86.9)	64 (17.8)	71 (21.7)	28.30 (95.56)
74.31 (55.41)	6861 (30.52)	4.06 (6.54)	2398	10.11	8th (5L) Gear			186 (85.3)	50 (10.0)	57 (13.9)	28.67 (96.81)
72.19 (53.83)	5647 (25.12)	4.79 (7.71)	2400	7.66	9th (4H) Gear			185 (85.0)	49 (9.4)	56 (13.3)	28.67 (96.81)
74.35 (55.44)	4942 (21.98)	5.64 (9.08)	2399	6.20	10th (5H) Gear			185 (85.0)	49 (9.4)	55 (12.8)	28.66 (96.78)
74.79 (55.77)	4290 (19.08)	6.54 (10.52)	2399	5.45	11th (6L) Gear			185 (85.0)	50 (10.0)	59 (15.0)	28.68 (96.83)
70.48 (52.56)	2970 (13.21)	8.90 (14.32)	2401	3.68	12th (6H) Gear			185 (84.7)	51 (10.6)	60 (15.6)	28.69 (96.88)

Department of Agricultural Engineering

Dates of Test: April 17-27, 1984

Manufacturer: MASSEY FERGUSON S.A. RN 188 LA Boursidiere-92357 LePlessis, Robinson, France

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8408 **Fuel weight** 7.001 lbs/gal *(0.839 kg/l)* **Oil SAE** 20-20W **API service classification** SE, CC, CD **To motor** 3.678 gal *(13.923 l)* **Drained from motor** 3.098 gal *(11.729 l)* **Transmission and final drive lubricant** Massey Ferguson Permatran III fluid **Total time engine was operated** 46.0 hours.

ENGINE: Make Perkins Diesel **Type** six cylinder vertical **Serial No.** TW31040U709563K **Crankshaft** lengthwise **Rated rpm** 2400 **Bore and stroke** 3.875" × 5" *(98.4 mm × 127 mm)* **Compression ratio** 16 to 1 **Displacement** 354 cu in *(5798 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper elements **Muffler** vertical **Cooling medium temperature control** two thermostats.

CHASSIS: Type front wheel assist **Serial No.** Δ3505RWK322215Δ **Tread width** 63.8" *(1620 mm)* to 96.9" *(2460 mm)* front 63" *(1600 mm)* to 81.5" *(2070 mm)* **Wheel base** 107.3" *(2726 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 38.0" *(965 mm)* Vertical distance above roadway 40.7" *(1033 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph** *(km/h)* first 1.3 *(2.1)* second 1.8 *(2.8)* third 2.0 *(3.2)* fourth 2.7 *(4.4)* fifth 2.8 *(4.6)* sixth 3.8 *(6.1)* seventh 3.9 *(6.3)* eighth 4.6 *(7.4)* ninth 5.3 *(8.5)* tenth 6.1 *(9.8)* eleventh 7.0 *(11.3)* twelfth 9.4 *(15.1)* thirteenth 9.8 *(15.8)* fourteenth 13.1 *(21.1)* fifteenth 13.6 *(22.0)* sixteenth 18.2 *(29.3)* reverse 1.4 *(2.3)*, 1.9 *(3.1)*, 2.2 *(3.6)*, 3.0 *(4.8)*, 3.1 *(5.0)*, 4.1 *(6.7)*, 4.3 *(6.9)*, 5.0 *(8.1)*, 5.8 *(9.3)*, 6.7 *(10.8)*, 7.7 *(12.4)*, 10.2 *(16.5)* **Clutch** single dry disc hydraulically operated by foot pedal **Brakes** single wet disc hydraulically operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 194.5" *(4.94 m)* left 187" *(4.75 m)* (on concrete surface without brake) right 228" *(5.79 m)* left 222" *(5.64 m)* **Turning space diameter** (on concrete surface with brake applied) right 405" *(10.28 m)* left 391" *(9.93 m)* (on concrete surface without brake) right 471" *(11.96 m)* left 459" *(11.66 m)* **Power take-off** 540 rpm at 1992 engine rpm and 1000 rpm at 2091 engine rpm.

LUGGING ABILITY IN 10th (5H) GEAR

Crankshaft Speed rpm	2399	2155	1910	1678	1441	1198	961
Pull—lbs (kN)	4942 (21.98)	5333 (23.90)	5605 (25.11)	5986 (26.74)	5973 (26.77)	5996 (26.80)	5570 (24.97)
Increase in Pull %	0	8	13	21	21	21	13
Power—Hp (kW)	74.35 (55.44)	71.57 (53.37)	66.30 (49.44)	61.54 (45.89)	52.96 (39.49)	43.96 (32.78)	32.81 (24.47)
Speed—Mph (km/h)	5.64 (9.08)	5.03 (8.10)	4.44 (7.14)	3.87 (6.23)	3.33 (5.35)	2.75 (4.43)	2.21 (3.55)
Slip %	6.20	7.08	7.51	8.25	8.09	8.25	7.86

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive Engaged dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	81.0	80.0
75% of Pull at Maximum Power—Ten Hours		81.5
50% of Pull at Maximum Power—Two Hours		80.5
50% of Pull at Reduced Engine Speed—Two Hours		77.0
Bystander in 15th (8L) gear		90.5

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 10th (5H) Gear											
74.18 (55.32)	4792 (21.31)	5.81 (9.34)	2399	4.59	6.328 (23.953)	0.597 (0.363)	11.72 (2.309)	188 (86.7)	54 (12.2)	68 (19.7)	28.67 (96.81)
MAXIMUM POWER IN SELECTED GEARS											
70.26 (52.39)	10639 (47.32)	2.48 (3.99)	2470	14.85	5th (3L) Gear			188 (86.4)	65 (18.3)	70 (21.1)	28.30 (95.56)
76.84 (57.30)	6792 (30.21)	4.24 (6.83)	2400	7.04	8th (5L) Gear			187 (85.8)	50 (10.0)	58 (14.4)	28.68 (96.85)
75.55 (56.33)	4877 (21.69)	5.81 (9.35)	2400	4.47	10th (5H) Gear			185 (84.7)	48 (8.9)	54 (12.2)	28.66 (96.78)
75.44 (56.25)	4212 (18.73)	6.72 (10.81)	2401	3.92	11th (6L) Gear			185 (85.0)	50 (10.0)	56 (13.0)	28.69 (96.88)

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 18.4-38; 8; 18 (125)	Two 18.4-38; 8; 18 (125)
Ballast	—Liquid (each)	None	None
	—Tire equip. (each)	82 lb (37 kg)	None
Front Tires	—No., size, ply & psi (kPa)	Two 13.6-28; 8; 20 (140)	Two 13.6-28; 8; 20 (140)
Ballast	—Liquid (each)	None	None
	—Tire equip. (each)	48 lb (22 kg)	None
Height of Drawbar		24 in (610 mm)	24 in (610 mm)
Static Weight with Operator	—Rear	8590 lb (3896 kg)	8425 lb (3821 kg)
	—Front	4605 lb (2089 kg)	4510 lb (2046 kg)
	—Total	13195 lb (5985 kg)	12935 lb (5867 kg)

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 133°F (56.2°C). Eight gears were chosen between 15% slip and 10 mph (16.1 km/h). During inspection, cylinders 2, 3, 4 and 5 were found to have several deep scratches.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1511, June 18, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Massey Ferguson 3505 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1512
MASSEY FERGUSON 3525 DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1148 rpm)								
108.01 *(80.54)*	2400	6.954 *(26.322)*	0.450 *(0.274)*	15.53 *(3.060)*	183 *(83.8)*	56 *(13.3)*	75 *(23.8)*	28.66 *(96.78)*
Standard Power Take-off Speed (1000 rpm)—One Hour								
103.67 *(77.31)*	2091	6.219 *(23.538)*	0.420 *(0.255)*	16.67 *(3.284)*	182 *(83.4)*	57 *(14.0)*	75 *(23.8)*	28.62 *(96.65)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
95.20 *(70.99)*	2490	6.558 *(24.822)*	0.482 *(0.293)*	14.52 *(2.860)*	182 *(83.3)*	58 *(14.3)*	77 *(24.7)*	....
0.00 *(0.00)*	2617	2.659 *(10.065)*	— —	— —	177 *(80.6)*	57 *(13.9)*	74 *(23.3)*	....
49.05 *(36.58)*	2565	4.645 *(17.582)*	0.663 *(0.403)*	10.56 *(2.080)*	180 *(81.9)*	58 *(14.4)*	77 *(24.7)*	....
108.92 *(81.22)*	2400	6.999 *(26.494)*	0.449 *(0.273)*	15.56 *(3.066)*	183 *(83.9)*	58 *(14.4)*	76 *(24.4)*	....
24.77 *(18.47)*	2590	3.654 *(13.832)*	1.032 *(0.628)*	6.78 *(1.335)*	178 *(81.1)*	57 *(13.9)*	75 *(23.9)*	....
72.69 *(54.21)*	2534	5.588 *(21.153)*	0.538 *(0.327)*	13.01 *(2.563)*	180 *(82.2)*	57 *(13.9)*	75 *(23.9)*	....
Av 58.44 Av *(43.58)*	2532	5.017 *(18.991)*	0.601 *(0.365)*	11.65 *(2.294)*	180 *(82.2)*	58 *(14.2)*	76 *(24.2)*	28.63 *(96.67)*

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 10th (5H) Gear											
88.68 *(66.13)*	6005 *(26.71)*	5.54 *(8.91)*	2400	8.11	7.012 *(26.544)*	0.553 *(0.336)*	12.65 *(2.491)*	187 *(85.8)*	48 *(8.6)*	53 *(11.4)*	28.56 *(96.45)*
75% of Pull at Maximum Power—Ten Hours 10th (5H) Gear											
72.31 *(53.92)*	4552 *(20.25)*	5.96 *(9.59)*	2517	5.85	6.273 *(23.746)*	0.607 *(0.369)*	11.53 *(2.271)*	186 *(85.3)*	43 *(6.3)*	56 *(13.1)*	29.04 *(98.07)*
50% of Pull at Maximum Power—Two Hours 10th (5H) Gear											
49.96 *(37.26)*	3035 *(13.50)*	6.17 *(9.94)*	2565	4.17	5.368 *(20.321)*	0.752 *(0.457)*	9.31 *(1.834)*	185 *(85.0)*	39 *(3.8)*	44 *(6.4)*	29.08 *(98.20)*
50% of Pull at Reduced Engine Speed—Two Hours 13th (7L) Gear											
49.93 *(37.23)*	3036 *(13.50)*	6.17 *(9.93)*	1980	4.10	3.617 *(13.691)*	0.507 *(0.308)*	13.80 *(2.719)*	184 *(84.4)*	42 *(5.5)*	48 *(8.9)*	29.01 *(98.25)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
84.45 *(62.97)*	9322 *(41.47)*	3.40 *(5.47)*	2461	14.94	7th (4L) Gear	186 *(85.3)*	35 *(1.7)*	40 *(4.4)*	29.05 *(98.10)*
88.19 *(65.77)*	8371 *(37.24)*	3.95 *(6.36)*	2399	12.68	8th (5L) Gear	187 *(85.8)*	41 *(5.0)*	47 *(8.3)*	28.50 *(96.24)*
88.15 *(65.74)*	7043 *(31.33)*	4.69 *(7.55)*	2400	9.62	9th (4H) Gear	186 *(85.6)*	41 *(5.0)*	47 *(8.3)*	28.49 *(96.21)*
89.92 *(67.06)*	6069 *(26.99)*	5.56 *(8.94)*	2398	7.95	10th (5H) Gear	186 *(85.6)*	40 *(4.4)*	46 *(7.8)*	28.48 *(96.17)*
91.22 *(68.02)*	5308 *(23.61)*	6.45 *(10.37)*	2399	6.92	11th (6L) Gear	187 *(85.8)*	42 *(5.6)*	50 *(10.0)*	28.53 *(96.34)*
87.70 *(65.40)*	3740 *(16.64)*	8.79 *(14.15)*	2401	4.67	12th (6H) Gear	187 *(85.8)*	42 *(5.6)*	51 *(10.6)*	28.54 *(96.38)*

Department of Agricultural Engineering

Dates of Test: April 17 to May 1, 1984

Manufacturer: MASSEY FERGUSON S.A. RN 188 LA Boursidiere-92357, Le Plessis, Robinson, France

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8401 **Fuel weight** 6.995 lbs/gal *(0.838 kg/l)* **Oil SAE** 20-20W **API service classification** SE, CC, CD **To motor** 4.022 gal *(15.223 l)* **Drained from motor** 3.452 gal *(13.069 l)* **Transmission and final drive lubricant** Massey Ferguson Permatran III fluid **Total time engine was operated** 47.5 hours.

ENGINE: **Make** Perkins Diesel **Type** six cylinder vertical with turbocharger **Serial No.** TU31107U706132R **Crankshaft** lengthwise **Rated rpm** 2400 **Bore and stroke** 3.875" × 5" *(98.4 mm × 127 mm)* **Compression ratio** 15.5 to 1 **Displacement** 354 cu in *(5798 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** two paper cartridges **Oil cooler** heat exchanger in lower part of radiator for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper elements **Muffler** vertical **Cooling medium temperature control** two thermostats.

CHASSIS: **Type** front wheel assist **Serial No.** Δ3525RWK320219Δ **Tread width** rear 63.8" *(1620 mm)* to 96.9" *(2460 mm)* front 63.0" *(1600 mm)* to 81.5" *(2070 mm)* **Wheel base** 107.3" *(2726 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 38.5" *(978 mm)* Vertical distance above roadway 40.7" *(1033 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph (km/h)** first 1.3 *(2.1)* second 1.8 *(2.8)* third 2.0 *(3.3)* fourth 2.7 *(4.4)* fifth 2.8 *(4.6)* sixth 3.8 *(6.1)* seventh 3.9 *(6.3)* eighth 4.6 *(7.4)* ninth 5.3 *(8.5)* tenth 6.1 *(9.8)* eleventh 7.0 *(11.3)* twelfth 9.4 *(15.1)* thirteenth 9.8 *(15.8)* fourteenth 13.1 *(21.1)* fifteenth 13.7 *(22.0)* sixteenth 18.2 *(29.3)* reverse 1.5 *(2.3)*, 1.9 *(3.1)*, 2.2 *(3.6)*, 3.0 *(4.8)*, 3.1 *(5.0)*, 4.1 *(6.7)*, 4.3 *(6.9)*, 5.0 *(8.1)*, 5.8 *(9.3)*, 6.7 *(10.8)*, 7.7 *(12.4)*, 10.2 *(16.5)* **Clutch** single dry disc hydraulically operated by foot pedal **Brakes** single wet disc hydraulically operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 194.5" *(4.94 m)* left 187" *(4.75 m)* (on concrete surface without brake) right 228" *(5.79 m)* left 222" *(5.64 m)* **Turning space diameter** (on concrete surface with brake applied) right 405" *(10.28 m)* left 391" *(9.93 m)* (on concrete surface without brake) right 471" *(11.96 m)* left 459" *(11.66 m)* **Power take-off** 540 rpm at 1992 engine rpm and 1000 rpm at 2091 engine rpm.

LUGGING ABILITY IN 10th (5H) GEAR

Crankshaft Speed rpm	2398	2150	1919	1693	1428	1195
Pull—lbs *(kN)*	6069 *(26.99)*	6605 *(29.40)*	7195 *(32.23)*	7801 *(34.47)*	7650 *(34.29)*	7587 *(33.11)*
Increase in Pull %	0	9	19	27	26	22
Power—Hp *(kW)*	89.92 *(67.06)*	87.31 *(65.11)*	83.57 *(62.32)*	77.88 *(58.07)*	65.41 *(48.78)*	53.08 *(39.58)*
Speed—Mph *(km/h)*	5.56 *(8.94)*	4.95 *(7.97)*	4.36 *(7.01)*	3.80 *(6.11)*	3.21 *(5.16)*	2.69 *(4.34)*
Slip %	7.95	8.57	9.60	10.78	10.64	10.10

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive Engaged dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	80.5	81.5
75% of Pull at Maximum Power—Ten Hours		80.5
50% of Pull at Maximum Power—Two Hours		80.0
50% of Pull at Reduced Engine Speed—Two Hours		76.5
Bystander in 15th (8L) gear		89.0

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 10th (5H) Gear											
90.10 *(67.19)*	5894 *(26.22)*	5.73 *(9.23)*	2401	5.73	6.991 *(26.463)*	0.543 *(0.330)*	12.89 *(2.539)*	187 *(86.1)*	45 *(6.9)*	57 *(13.9)*	28.60 *(96.58)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
80.16 *(59.77)*	12023 *(53.48)*	2.50 *(4.02)*	2400	14.79	5th (3L) Gear	185 *(85.0)*	35 *(1.7)*	40 *(4.4)*	29.01 *(97.96)*
91.74 *(68.41)*	8240 *(36.65)*	4.18 *(6.72)*	2400	8.41	8th (5L) Gear	187 *(85.8)*	41 *(5.0)*	48 *(8.9)*	28.51 *(96.27)*
91.34 *(68.11)*	5959 *(26.50)*	5.75 *(9.25)*	2401	5.54	10th (5H) Gear	186 *(85.3)*	40 *(4.4)*	45 *(7.0)*	28.47 *(96.14)*
92.27 *(68.81)*	5213 *(23.19)*	6.64 *(10.68)*	2401	4.93	11th (6L) Gear	186 *(85.6)*	42 *(5.6)*	49 *(9.4)*	28.52 *(96.31)*

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 18.4-38; 8; 20 *(140)*	Two 18.4-38; 8; 20 *(140)*
Ballast	—Liquid (each)	535 lb *(243 kg)*	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi (kPa)	Two 13.6-28; 8; 22 *(150)*	Two 13.6-28; 8; 22 *(150)*
Ballast	—Liquid (each)	230 lb *(104 kg)*	None
	—Cast Iron (each)	None	None
Height of Drawbar		24 in *(610 mm)*	24 in *(610 mm)*
Static Weight with Operator	—Rear	9520 lb *(4318 kg)*	8450 lb *(3833 kg)*
	—Front	5125 lb *(2325 kg)*	4650 lb *(2109 kg)*
	—Total	14645 lb *(6643 kg)*	13100 lb *(5942 kg)*

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 145°F *(61.5°C)*. Six gears were chosen between 15% slip and 10 mph *(16.1 km/h)*. During inspection, a longitudinal scratch was found in cylinder No. 4.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1512, June 18, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Massey Ferguson 3525 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1513
MASSEY FERGUSON 3545 DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1147 rpm)								
126.73 (94.50)	2400	7.987 (30.233)	0.441 (0.268)	15.86 (3.124)	186 (85.5)	57 (13.9)	75 (24.1)	28.91 (97.63)
Standard Power Take-off Speed (1000 rpm)—One Hour								
128.15 (95.56)	2092	7.181 (27.179)	0.411 (0.250)	17.84 (3.514)	185 (85.1)	57 (13.8)	75 (23.9)	28.90 (97.59)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
111.71 (83.30)	2467	7.420 (28.089)	0.466 (0.283)	15.06 (2.966)	183 (83.7)	57 (13.9)	76 (24.2)	— —
0.00 (0.00)	2514	2.852 (10.796)	— —	— —	179 (81.7)	57 (13.6)	75 (23.6)	— —
57.56 (42.93)	2560	5.211 (19.725)	0.633 (0.385)	11.04 (2.176)	182 (83.3)	57 (13.9)	76 (24.2)	— —
127.13 (94.80)	2400	8.077 (30.576)	0.441 (0.268)	15.80 (3.120)	187 (86.1)	57 (13.9)	76 (24.4)	— —
29.05 (21.66)	2586	4.061 (15.374)	0.978 (0.595)	7.15 (1.409)	180 (82.2)	56 (13.3)	75 (23.6)	— —
85.18 (63.52)	2559	6.352 (24.045)	0.521 (0.317)	13.41 (2.642)	183 (83.9)	57 (13.6)	75 (23.6)	— —
Av 68.44 Av (51.04)	2509	5.660 (21.426)	0.577 (0.351)	12.09 (2.382)	183 (83.6)	57 (13.7)	75 (23.9)	28.88 (97.53)

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 10th (5H) Gear											
102.57 (76.49)	6555 (29.16)	5.87 (9.45)	2401	7.98	7.965 (30.149)	0.544 (0.331)	12.88 (2.537)	189 (87.2)	45 (7.2)	54 (12.2)	28.84 (97.39)
75% of Pull at Maximum Power—Ten Hours 10th (5H) Gear											
82.90 (61.82)	4951 (22.02)	6.28 (10.11)	2520	6.17	7.254 (27.459)	0.610 (0.371)	11.43 (2.251)	187 (86.1)	42 (5.7)	43 (6.2)	28.75 (97.08)
50% of Pull at Maximum Power—Two Hours 10th (5H) Gear											
57.27 (42.70)	3300 (14.68)	6.51 (10.47)	2558	4.20	5.960 (22.562)	0.726 (0.441)	9.61 (1.893)	187 (86.1)	45 (7.2)	56 (13.3)	28.68 (96.85)
50% of Pull at Reduced Engine Speed—Two Hours 13th (7L) Gear											
57.38 (42.79)	3301 (14.68)	6.52 (10.49)	1509	4.12	4.167 (15.773)	0.508 (0.309)	13.77 (2.712)	186 (85.6)	49 (9.4)	61 (16.1)	28.66 (96.78)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
108.56 (80.95)	10063 (44.76)	4.05 (6.51)	2445	14.98	7th (4L) Gear	188 (86.7)	43 (6.1)	51 (10.6)	28.88 (97.52)
102.54 (76.47)	9901 (44.04)	4.25 (6.84)	2401	11.68	8th (5L) Gear	188 (86.7)	44 (6.7)	50 (10.0)	28.88 (97.52)
108.32 (80.77)	7561 (33.63)	4.98 (8.01)	2400	9.43	9th (4H) Gear	189 (86.9)	45 (7.2)	51 (10.6)	28.88 (97.52)
105.26 (78.49)	6601 (29.36)	5.87 (9.44)	2398	8.02	10th (5H) Gear	188 (86.7)	45 (7.2)	53 (11.7)	28.87 (97.49)
106.16 (79.16)	5786 (25.74)	6.88 (11.07)	2400	6.87	11th (6L) Gear	189 (86.9)	45 (7.2)	54 (12.2)	28.87 (97.49)
100.14 (74.67)	4042 (17.98)	9.29 (14.95)	2399	4.73	12th (6H) Gear	188 (86.7)	45 (7.2)	53 (11.7)	28.86 (97.46)

Department of Agricultural Engineering

Dates of Test: April 14-25, 1984

Manufacturer: MASSEY FERGUSON S.A. BN 188 LA Boursidiere-92357, Le Plessis, Robinson, France

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8401 **Fuel weight** 6.995 lbs/gal *(0.838 kg/l)* **Oil SAE** 15-20W **API service classification** SE, CC, CD **To motor** 4.902 gal *(18.556 l)* **Drained from motor** 3.020 gal *(11.432 l)* **Transmission and final drive lubricant** Massey Ferguson Permatran III fluid **Total time engine was operated** 55.0 hours.

ENGINE: **Make** Perkins Diesel **Type** six cylinder vertical with turbocharger and intercooler **Serial No.** TU51095U708461K **Crankshaft** lengthwise **Rated rpm** 2400 **Bore and stroke** 3.875" × 5.0" *(98.4 mm × 127 mm)* **Compression ratio** 15.5 to 1 **Displacement** 354 cu in *(5798 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** two full flow cartridges **Oil cooler** heat exchanger in lower part of radiator for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper elements **Muffler** vertical **Cooling medium temperature control** two thermostats.

CHASSIS: **Type** front wheel assist **Serial No.** A3545RWE309703A **Tread width** rear 63.8" *(1620 mm)* to 96.9" *(2460 mm)* front 63.0" *(1600 mm)* to 81.5" *(2070 mm)* **Wheel base** 107.3" *(2726 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 38.7" *(983 mm)* Vertical distance above roadway 39.8" *(1010 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph (km/h)** first 1.4 *(2.2)* second 1.8 *(2.9)* third 2.1 *(3.4)* fourth 2.7 *(4.3)* fifth 3.0 *(4.8)* sixth 3.9 *(6.3)* seventh 4.1 *(6.6)* eighth 4.8 *(7.7)* ninth 5.5 *(8.8)* tenth 6.3 *(10.2)* eleventh 7.3 *(11.7)* twelfth 9.7 *(15.6)* thirteenth 10.1 *(16.3)* fourteenth 13.6 *(21.9)* fifteenth 14.2 *(22.8)* sixteenth 18.9 *(30.5)* reverse 1.5 *(2.4)*, 2.0 *(3.2)*, 2.3 *(3.7)*, 3.1 *(4.9)*, 3.2 *(5.2)*, 4.3 *(6.9)*, 4.5 *(7.2)*, 5.2 *(8.4)*, 6.0 *(9.6)*, 6.9 *(11.2)*, 8.0 *(12.8)*, 10.6 *(17.1)* **Clutch** single dry disc hydraulically operated by foot pedal **Brakes** single wet disc hydraulically operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 194.5" *(4.94 m)* left 187" *(4.75 m)* (on concrete surface without brake) right 228" *(5.79 m)* left 222" *(5.64 m)* **Turning space diameter** (on concrete surface with brake applied) right 405" *(10.28 m)* left 391" *(9.93 m)* (on concrete surface without brake) right 471" *(11.96 m)* left 459" *(11.66 m)* **Power take-off** 540 rpm at 1992 engine rpm and 1000 rpm at 2092 engine rpm.

REPAIRS and ADJUSTMENTS: During drawbar limber up run, the engine oil began leaking from the outlet fitting of the oil cooler. The fitting was tightened and limber up resumed.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 142°F *(61.3°C)*. Six gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1513, June 18, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

LUGGING ABILITY IN 10th (5H) GEAR

Crankshaft Speed rpm	2399	2164	1915	1680	1439	1196
Pull—lbs (kN)	6601 (29.36)	7213 (32.09)	8085 (35.97)	8211 (36.53)	8067 (36.16)	7450 (33.39)
Increase in Pull %	0	9	22	24	22	13
Power—Hp (kW)	105.25 (77.88)	100.04 (74.60)	97.97 (73.06)	87.45 (65.21)	73.92 (55.12)	57.27 (42.71)
Speed—Mph (km/h)	5.97 (9.61)	5.24 (8.43)	4.58 (7.37)	4.08 (6.56)	3.44 (5.53)	2.88 (4.64)
Slip %	8.02	8.92	9.94	10.32	10.25	9.36

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive Engaged dB(A)	Disengaged dB(A)
Maximum Available Power—Two Hours	83.0	82.5
75% of Pull at Maximum Power—Ten Hours		81.0
50% of Pull at Maximum Power—Two Hours		82.5
50% of Pull at Reduced Engine Speed—Two Hours		78.0
Bystander in 15th (8L) gear		88.0

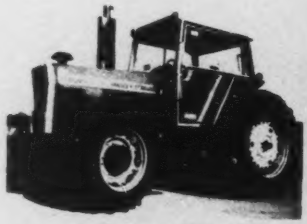
DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 10th (5H) Gear											
104.90 (78.22)	6505 (28.93)	6.05 (9.73)	2399	5.60	7.956 (30.116)	0.531 (0.323)	13.19 (2.597)	189 (86.9)	46 (7.8)	52 (11.1)	28.85 (97.42)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
97.19 (72.48)	13982 (62.20)	2.61 (4.20)	2405	14.94	5th (3L) Gear	187 (85.8)	39 (3.9)	45 (7.2)	28.67 (96.81)
106.64 (79.52)	9036 (40.19)	4.43 (7.12)	2400	7.91	8th (5L) Gear	188 (86.7)	44 (6.7)	49 (9.4)	28.88 (97.52)
105.75 (78.86)	6551 (29.14)	6.05 (9.74)	2399	5.57	10th (5H) Gear	188 (86.7)	45 (7.2)	52 (11.1)	28.88 (97.52)
106.91 (79.73)	5724 (25.46)	7.00 (11.27)	2399	4.04	11th (6L) Gear	188 (86.9)	45 (7.2)	53 (11.7)	28.86 (97.46)

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 20.8-38; 8; 18 (125)	Two 20.8-38; 8; 18 *(125)*
Ballast	—Liquid (each)	1420 lb *(644 kg)*	None
	—Cast iron (each)	None	None
Front Tires	—No., size, ply & psi (kPa)	Two 14.9-28; 6; 20 *(140)*	Two 14.9-28; 6; 20 *(140)*
Ballast	—Liquid (each)	540 lb *(245 kg)*	None
	—Cast iron (each)	None	None
Height of Drawbar		22 in *(560 mm)*	22 in *(560 mm)*
Static Weight with Operator—Rear		11590 lb *(5257 kg)*	8550 lb *(3878 kg)*
	—Front	5665 lb *(2570 kg)*	4750 lb *(2155 kg)*
	—Total	17255 lb *(7827 kg)*	13300 lb *(6033 kg)*



Massey Ferguson 3545 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1518 — VERSATILE 256 DIESEL HYDROSTATIC

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—552 rpm)								
84.36 *(62.91)*	2500	5.211 *(19.723)*	0.432 *(0.263)*	16.19 *(3.190)*	185 *(84.7)*	64 *(17.7)*	75 *(23.8)*	28.81 *(97.29)*
Standard Power Take-off Speed (540 rpm) — One hour)								
85.06 *(63.44)*	2447	5.171 *(19.574)*	0.425 *(0.259)*	16.45 *(3.241)*	188 *(86.6)*	65 *(18.1)*	76 *(24.3)*	28.81 *(97.29)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
74.59 *(55.62)*	2603	4.874 *(18.451)*	0.457 *(0.278)*	15.30 *(3.015)*	183 *(83.6)*	63 *(17.2)*	73 *(22.8)*	....
0.00 *(0.00)*	2714	1.788 *(6.767)*	....	....	178 *(81.1)*	64 *(17.5)*	74 *(23.3)*	....
37.82 *(28.20)*	2637	3.202 *(12.122)*	0.593 *(0.360)*	11.81 *(2.326)*	187 *(86.1)*	65 *(18.1)*	75 *(23.6)*	....
85.14 *(63.49)*	2501	5.226 *(19.781)*	0.430 *(0.261)*	16.29 *(3.210)*	188 *(86.4)*	65 *(18.1)*	75 *(23.9)*	....
19.08 *(14.23)*	2660	2.465 *(9.331)*	0.904 *(0.550)*	7.74 *(1.525)*	187 *(86.1)*	65 *(18.3)*	76 *(24.4)*	....
56.00 *(41.76)*	2605	3.957 *(14.978)*	0.494 *(0.301)*	14.15 *(2.788)*	182 *(83.3)*	65 *(18.1)*	75 *(23.6)*	....
Av 45.44 Av *(33.88)*	2620	3.585 *(13.572)*	0.552 *(0.336)*	12.67 *(2.497)*	184 *(84.4)*	64 *(17.9)*	75 *(23.6)*	28.82 *(97.33)*

The following performance figures apply to tractor chassis S/N 256 85 209050 and above.

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 5.5 MPH 2nd Range											
60.62 *(45.20)*	4122 *(18.34)*	5.51 *(8.87)*	2500	3.53	5.130 *(19.419)*	0.592 *(0.360)*	11.82 *(2.328)*	193 *(89.2)*	69 *(20.6)*	79 *(26.1)*	29.03 *(98.01)*
75% of Pull at Maximum Power—Ten Hours 5.5 MPH 2nd Range											
51.69 *(38.54)*	3219 *(14.32)*	6.02 *(9.69)*	2599	2.53	4.668 *(17.672)*	0.652 *(0.394)*	11.07 *(2.181)*	195 *(90.7)*	68 *(19.8)*	75 *(23.8)*	28.95 *(97.76)*
50% of Pull at Maximum Power—Two Hours 5.5 MPH 2nd Range											
36.05 *(26.88)*	2146 *(9.55)*	6.30 *(10.14)*	2612	1.56	3.787 *(14.335)*	0.735 *(0.447)*	9.52 *(1.875)*	189 *(87.2)*	74 *(23.1)*	84 *(28.9)*	29.01 *(97.95)*
50% of Pull at Reduced Engine Speed—Two Hours **Speed Setting—6.8 MPH 3rd Range at 2500 Engine RPM**											
36.05 *(26.87)*	2147 *(9.55)*	6.29 *(10.13)*	1600	1.63	2.979 *(11.278)*	0.579 *(0.352)*	12.09 *(2.382)*	184 *(84.2)*	69 *(20.3)*	71 *(21.7)*	29.01 *(97.95)*
MAXIMUM POWER AT SELECTED SPEEDS											
54.49 *(40.64)*	9134 *(40.63)*	2.24 *(3.60)*	2501	14.78	The infinitely		1st Range	183 *(83.9)*	59 *(15.0)*	66 *(18.9)*	29.02 *(98.00)*
60.77 *(45.31)*	7490 *(33.36)*	3.04 *(4.89)*	2499	8.15	variable drive		1st Range	193 *(89.4)*	59 *(15.0)*	66 *(18.9)*	29.02 *(98.00)*
61.50 *(45.86)*	6647 *(29.57)*	3.47 *(5.58)*	2501	6.74	control was		1st Range	186 *(85.6)*	60 *(15.6)*	67 *(19.4)*	29.03 *(98.03)*
60.38 *(45.03)*	5649 *(25.13)*	4.01 *(6.45)*	2502	5.36	set to give		1st Range	183 *(83.9)*	60 *(15.6)*	67 *(19.4)*	29.03 *(98.03)*
61.61 *(45.94)*	5082 *(22.61)*	4.55 *(7.32)*	2499	4.68	the travel		2nd Range	191 *(88.1)*	63 *(17.2)*	69 *(20.6)*	29.04 *(98.06)*
62.60 *(46.68)*	4607 *(20.49)*	5.00 *(8.04)*	2499	4.25	speeds shown.		2nd Range	194 *(89.7)*	63 *(17.2)*	69 *(20.6)*	29.04 *(98.06)*
62.81 *(46.84)*	4292 *(19.09)*	5.49 *(8.83)*	2500	3.69			2nd Range	193 *(89.2)*	65 *(18.3)*	72 *(22.2)*	29.05 *(98.10)*
61.76 *(46.05)*	3861 *(17.17)*	6.00 *(9.65)*	2499	3.24			2nd Range	191 *(88.3)*	65 *(18.3)*	73 *(22.8)*	29.05 *(98.10)*
60.60 *(45.19)*	3504 *(15.58)*	6.49 *(10.44)*	2498	2.99			2nd Range	189 *(87.2)*	66 *(18.9)*	74 *(23.3)*	29.05 *(98.10)*
60.06 *(44.79)*	3221 *(14.33)*	6.99 *(11.25)*	2500	2.80			2nd Range	186 *(85.6)*	66 *(18.9)*	75 *(23.9)*	29.04 *(98.06)*

Department of Agricultural Engineering

Dates of Test: May 10-21, 1984

Manufacturer: VERSATILE FARM EQUIPMENT, 1260 Clarence Avenue, Winnipeg, Manitoba Canada R3T 1T5

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8405 **Fuel weight** 6.998 lbs/gal *(0.839 kg/l)* **Oil SAE** 15W-40 **API service classification** SE, CC, CD **To motor** 2.809 gal *(10.633 l)* **Drained from motor** 2.315 gal *(8.763 l)* **Transmission and final drive lubricant** Versatile Hy-Gear 23 **Hydrostatics fluid** Dexron II **Final drive lubricant** SAE 85W90 **Total time engine was operated** 48.5 hours.

ENGINE: Make Consolidated Diesel Corporation Diesel **Type** four cylinder vertical with turbocharger **Serial No.** 44105169 **Crankshaft** lengthwise **Rated rpm** 2500 **Bore and stroke** 4.02" × 4.72" *(102 mm × 120 mm)* **Compression ratio** 17.5 to 1 **Displacement** 239 cu in *(3921 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydrostatics oil **Fuel filter** two paper cartridges **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type four wheel drive **Serial No.** 256 84 205769 **Tread width** rear 63.4" *(1610 mm)* to 95.2" *(2418 mm)* front 63.4" *(1610 mm)* to 95.2" *(2418 mm)* **Wheel base** 86" *(2184 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 46.5" *(1181 mm)* Vertical distance above roadway 37" *(940 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** infinitely variable hydrostatic using a variable displacement pump and fixed displacement motor, plus a 3 speed manual transmission. **Advertised speeds mph (km/h) Late chassis S/N** forward 0-5.2 *(8.4)*, 0-8.5 *(13.7)*, 0-19.9 *(32.0)* reverse 0-5.2 *(8.4)*, 0-8.5 *(13.7)*, 0-19.9 *(32.0)* **Early chassis S/N** forward 0-5.2 *(8.4)*, 0-9.7 *(15.6)*, 0-19.9 *(32.0)*, reverse 0-5.2 *(8.4)*, 0-9.7 *(15.6)*, 0-19.9 *(32.0)* **Clutch** none **Brakes** caliper disc hydraulically operated by foot pedal **Steering** hydrostatic and articulated **Turning radius** (on concrete surface without brake) right 173.8" *(4.41 m)* left 173.8" *(4.41 m)* **Turning space diameter** (on concrete surface without brake) right 362.8" *(9.21 m)* left 362.8" *(9.21 m)* **Power take-off** 540 rpm at 2447 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

TRACTOR SOUND LEVEL WITH CAB	early S/N dB(A)	late S/N dB(A)
Maximum Available Power—Two Hours	81.5	78.3
75% of Pull at Maximum Power—Ten Hours		79.0
50% of Pull at Maximum Power—Two Hours		79.0
50% of Pull at Reduced Engine Speed—Two Hours		76.0
Bystander in 3rd Range		88.0

SUPPLEMENTARY TESTS

The following performance figures apply to tractor chassis S/N 256 84 205789 and below.

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 5.5 MPH 2nd Range											
61.13 *(45.59)*	4157 *(18.49)*	5.52 *(8.88)*	2500	3.43	5.194 *(19.663)*	0.595 *(0.362)*	11.77 *(2.318)*	192 *(88.9)*	66 *(18.9)*	71 *(21.7)*	28.81 *(97.27)*
MAXIMUM POWER AT SELECTED SPEEDS											
53.05 *(39.56)*	9143 *(40.67)*	2.18 *(3.50)*	2518	14.97	The infinitely		1st Range	192 *(88.6)*	64 *(17.8)*	67 *(19.4)*	28.86 *(97.46)*
58.91 *(43.93)*	7368 *(32.77)*	3.00 *(4.83)*	2501	7.73	variable drive		1st Range	183 *(83.9)*	64 *(17.8)*	67 *(19.4)*	28.86 *(97.46)*
59.72 *(44.54)*	6438 *(28.64)*	3.48 *(5.60)*	2499	6.14	control was		1st Range	197 *(91.7)*	64 *(17.8)*	67 *(19.4)*	28.86 *(97.46)*
60.07 *(44.79)*	5631 *(25.05)*	4.00 *(6.44)*	2500	5.17	set to give		1st Range	186 *(85.6)*	65 *(18.3)*	68 *(20.0)*	28.85 *(97.42)*
59.95 *(44.71)*	4953 *(22.03)*	4.54 *(7.31)*	2501	4.31	the travel		2nd Range	199 *(92.5)*	65 *(18.3)*	68 *(20.0)*	28.85 *(97.42)*
60.73 *(45.29)*	4565 *(20.31)*	4.99 *(8.03)*	2499	3.87	speeds shown.		2nd Range	195 *(90.3)*	65 *(18.3)*	68 *(20.0)*	28.85 *(97.42)*
61.58 *(45.92)*	4185 *(18.62)*	5.52 *(8.88)*	2502	3.43			2nd Range	200 *(93.1)*	66 *(18.9)*	71 *(21.7)*	28.80 *(97.25)*
62.29 *(46.45)*	3878 *(17.25)*	6.02 *(9.70)*	2500	3.18			2nd Range	185 *(84.7)*	66 *(18.9)*	69 *(20.6)*	28.84 *(97.39)*
62.32 *(46.47)*	3592 *(15.98)*	6.51 *(10.47)*	2499	2.92			2nd Range	189 *(87.2)*	66 *(18.9)*	69 *(20.6)*	28.84 *(97.39)*
62.55 *(46.64)*	3337 *(14.84)*	7.03 *(11.31)*	2501	2.60			2nd Range	191 *(88.1)*	66 *(18.9)*	70 *(21.1)*	28.83 *(97.35)*
61.92 *(46.17)*	3105 *(13.81)*	7.48 *(12.03)*	2502	2.34			2nd Range	189 *(86.9)*	66 *(18.9)*	70 *(21.1)*	28.83 *(97.35)*
58.92 *(43.93)*	2328 *(10.36)*	9.49 *(15.27)*	2502	1.76			3rd Range	194 *(89.7)*	66 *(18.9)*	71 *(21.7)*	28.83 *(97.35)*

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 16.9-28; 6; 18 *(125)*	Two 16.9-28; 6; 18 *(125)*
Ballast	—Liquid (each)	None	None
	—Test Equip. (each)	105 lb *(48 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 16.9-28; 6; 18 *(125)*	Two 16.9-28; 6; 18 *(125)*
Ballast	—Liquid (each)	550 lb *(249 kg)*	None
	—Cast Iron (each)	None	None
Height of Drawbar		18 in *(460 mm)*	18 in *(460 mm)*
Static Weight with Operator	—Rear	4410 lb *(2000 kg)*	4200 lb *(1905 kg)*
	—Front	6050 lb *(2744 kg)*	4950 lb *(2245 kg)*
	—Total	10460 lb *(4744 kg)*	9150 lb *(4150 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 131°F *(55.0°C)*. Twelve travel speeds were chosen between 15% slip and 10 mph *(16.1 km/h)*. The tractor was tested with the new transmission (SN 256 85 209050 and above). The supplementary tests were performed with the older transmission (SN 256 84 205789 and below).

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1518,** July 3, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Versatile 256 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

60.36 *(45.01)*	5018 *(22.32)*	7.50 *(12.07)*	2499	2.34	2nd Range	192 *(88.9)*	67 *(19.4)*	76 *(24.4)*	29.04 *(98.06)*
58.09 *(43.32)*	2296 *(10.21)*	9.49 *(15.27)*	2499	1.82	3rd Range	192 *(88.9)*	67 *(19.4)*	76 *(24.4)*	29.04 *(98.06)*

LUGGING ABILITY FROM SPEED SETTING 5.5 MPH 2ND RANGE

Crankshaft Speed rpm	2500	2251	1999	1745	1501	1256
Pull—lbs *(kN)*	4292 *(19.09)*	4770 *(21.38)*	5215 *(23.37)*	5571 *(24.97)*	5525 *(24.76)*	5518 *(24.73)*
Increase in Pull %	0	11	21	30	29	29
Power—Hp *(kW)*	62.81 *(46.84)*	61.08 *(45.55)*	57.70 *(43.02)*	52.02 *(38.79)*	44.81 *(33.42)*	37.40 *(27.89)*
Speed—Mph *(km/h)*	5.49 *(8.83)*	4.80 *(7.73)*	4.15 *(6.68)*	3.50 *(5.64)*	3.04 *(4.90)*	2.54 *(4.09)*
Slip %	3.69	4.12	4.74	5.24	5.24	5.11

Ten-Year Summary of Test Reports, 1974-1984

						ENGINE									–FUEL CONSUMPTION (HP Hours Per Gallon) @:–				
																	–Varying Drawbar Power–		
MAKE AND MODEL OF TRACTOR	Test No.	Fuel Used	Weight With Ballast	Lbs. Ballast Carried	No. of Cylinders	Bore and Stroke	Displacement Cu. In.	Rated RPM Dwbr.	Max. PTO HP @ Rated Engine RPM	Std. PTO RPM	Max. PTO HP @ Std. PTO RPM	Max. Drawbar HP	MPH @ Max. Dwbr. HP	Max. Lbs. Pull	Max. PTO HP @ Std. PTO RPM	PTO Average @ Varying Power	Max. Available Power	75% of Pull Max. Power	50% of Pull @ Max. Power
Allis-Chalmers																			
175	1156	Gas	8400	2010	4	4.000x4.500	226	1800	60.88	540	56.02	53.17	5.50	6875	11.78	9.44	10.22	9.64	8.20
5020	1270	Die.	3358	1298	2	3.62x3.74	77	2500	21.79	540	20.78	18.05	5.74	2346	13.99	10.99	11.07	10.51	8.62
5030	1271	Die.	3876	1346	2	3.82x3.94	90.1	2500	26.42	540	25.61	23.92	4.26	3389	13.82	11.28	11.64	11.48	9.68
5040	1230	Die.	6240	2180	3	3.740x4.330	143	2400	40.05	540	36.69	35.86	5.00	4837	15.47	11.80	12.58	12.74	10.44
5050	1240	Die.	7690	3280	3	4.055x4.330	168	2700	51.46	540	47.16	45.22	5.68	6075	16.10	12.42	12.58	13.01	11.24
6060 8 Speed	1397	Die.	8945	2480	4	3.876x4.25	200	2300	63.83	540	64.90	52.24	4.83	6846	16.26	12.07	13.27	11.99	10.10
6080 12 Speed	1398	Die.	11790	4200	4	3.876x4.25	200	2300	83.66	1000	74.49	72.32	5.74	9003	15.70	13.14	14.27	12.81	10.93
6140	1445	Die.	6195	1735	3	3.858x4.055	142	2500	41.08	541	38.04	33.97	5.20	4768	13.47	10.20	10.87	10.25	8.88
7000 Powershift	1195	Die.	12580	3030	6	3.875x4.25	301	2200	106.44	1000	105.85	92.64	6.08	9907	15.70	12.21	13.21	12.27	10.16
7010PD 20 Speed	1345	Die.	12790	1530	6	3.875x4.25	301	2300	106.53	1000	107.52	91.44	6.05	9426	15.48	11.57	12.59	11.48	9.68
7010PS 12 Speed	1346	Die.	12740	1365	6	3.875x4.25	301	2300	106.72	1000	106.33	91.61	6.11	9516	15.43	11.74	12.43	11.35	9.58
7020 Powershift	1259	Die.	15610	3840	6	3.875x4.25	301	2300	123.79	1000	123.50	105.36	6.59	12001	16.01	12.45	13.10	12.25	10.34
7020 Power Director	1260	Die.	15655	4085	6	3.875x4.25	301	2300	123.85	1000	125.51	107.36	6.63	11964	16.08	12.12	13.09	12.08	10.13
7040	1166	Die.	17380	5585	6	4.25x5.00	426	2300	136.49	1000	136.26	117.12	4.77	13619	15.35	11.78	12.94	11.86	9.80
7040 Powershift	1196	Die.	17355	4977	6	4.25x5.00	426	2300	136.30	1000	136.15	117.75	4.61	13547	15.51	11.96	13.05	12.29	10.39
7045 Power Director	1261	Die.	18980	4745	6	4.25x5.00	426	2300	146.18	1000	146.46	127.84	7.04	15430	14.62	11.26	12.16	11.40	9.72
7045 Powershift	1308	Die.	18990	4390	6	4.25x5.00	426	2300	146.88	1000	146.67	127.61	6.92	15449	14.92	11.32	12.58	11.71	9.62
7060	1167	Die.	20490	6500	6	4.25x5.00	426	2300	161.51	1000	160.44	140.59	6.94	17370	15.99	12.71	13.63	12.75	10.55
7060 Powershift	1197	Die.	20560	5915	6	4.25x5.00	426	2300	161.42	1000	161.65	144.13	4.92	17851	16.08	12.76	13.80	12.96	10.79
7080	1168	Die.	21720	7115	6	4.25x5.00	426	2550	181.51	996	181.51	153.78	4.58	18478	15.71	12.24	13.23	12.11	10.02
7580	1229	Die.	25000	1490	6	4.25x5.00	426	2550	186.35	996	186.35	160.79	6.91	23310	14.81	11.47	12.22	11.39	9.40
8010 Powershift	1446	Die.	13185	555	6	3.875x4.25	301	2300	107.38	1000	109.55	93.01	6.16	9102	15.01	11.49	12.57	11.48	9.54
8030 Powershift	1447	Die.	17100	2085	6	4.25x5.00	426	2300	133.75	1000	134.42	116.65	6.35	13348	15.25	11.78	12.93	11.87	10.00
8050 Powershift	1448	Die.	19380	4075	6	4.25x5.00	426	2300	152.40	1000	155.15	134.13	4.89	16728	15.88	12.51	13.71	12.73	10.80
8070 Powershift	1449	Die.	22370	5520	6	4.25x5.00	426	2400	170.72	1000	171.44	147.29	5.87	18777	16.48	12.81	13.67	12.59	10.64
8550	1262	Die.	29360	2320	6	5.250x5.625	731	2500	253.88	998	253.88	224.18	5.83	26220	14.57	10.94	12.47	11.45	9.36
Belarus																			
250	1183	Die.	5490	939	2	4.134x4.724	127	1800	24.95	540	25.02	21.81	4.54	2280	15.56	13.23	13.19	13.20	11.80
T25A	1200	Die.	5490	939	2	4.134x4.724	127	1800	28.70	540	28.15	24.46	4.51	2570	13.95	13.46	12.21	13.48	11.94
1500 12 Speed	1333	Die.	19885	1120	6	5.118x4.528	558	2100	168.76	1000	169.63	151.96	5.31	19311	16.48	13.69	14.53	13.98	12.25
7100 16 Speed	1334	Die.	32460	None	12	5.118x5.512	1360	1900	269.62	1003	269.62	259.46	4.78	30845	15.85	13.26	14.82	14.35	12.56
Big Bud																			
525/50 9 Speed	1400	Die.	51920	None	6	6.25x6.25	1150	2100	....	....	....	421.49	5.64	42216	....	....	14.87	13.97	12.01
Case																			
1190 Manual	1378	Die.	6780	2160	3	3.939x4.500	165	2200	43.09	540	38.54	36.60	7.60	4620	14.99	13.09	12.22	12.59	11.39
1270	1160	Die.	18910	3440	6	4.375x5.000	451	2100	135.39	1000	135.41	121.83	6.46	15648	14.23	11.14	12.16	11.49	9.88
1290 Manual	1379	Die.	9320	2750	4	3.939x4.000	195	2200	53.73	540	47.80	46.41	4.97	6851	15.20	13.34	12.41	12.90	11.68
1390 Manual	1380	Die.	9780	3160	4	3.939x4.500	219	2200	60.59	1000	58.40	52.16	4.92	7348	15.58	13.36	12.89	13.24	11.77
1410 Manual	1209	Die.	10910	3160	4	3.939x4.500	219	2300	80.88	540	79.35	69.25	5.32	7846	17.47	14.69	14.20	14.38	12.45
1410 Powershift	1210	Die.	10930	3150	4	3.939x4.500	219	2300	80.61	540	76.21	67.98	7.90	7815	16.86	13.76	13.34	13.21	11.45
1490 Manual	1381	Die.	11305	3600	4	3.939x4.500	219	2200	70.51	1000	68.75	60.45	5.63	8340	17.18	13.62	13.82	13.00	11.25
1490 Powershift	1382	Die.	11060	2635	4	3.939x4.500	219	2200	70.91	1000	70.48	61.56	6.76	8405	16.42	12.36	13.12	12.01	10.20
1570	1218	Die.	20350	4060	6	4.625x5.000	504	2100	180.41	1003	180.41	152.96	5.02	17115	15.09	12.47	12.72	12.46	10.88
1594 Synchro	1546	Die.	11100	1755	6	3.939x4.500	329	2300	85.90	1000	80.83	73.54	5.29	8331	17.04	14.04	14.26	13.56	11.99
1594 Powershift	1547	Die.	11210	1745	6	3.939x4.500	329	2300	85.54	1000	81.94	70.59	5.47	8198	16.86	13.52	13.59	13.10	11.45
1690 Manual	1383	Die.	12470	3715	6	3.939x4.500	329	2300	90.39	1000	87.76	78.08	4.27	10536	15.95	13.95	13.20	13.50	12.26
1896 Powershift	1548	Die.	13925	430	6	4.016x4.724	359	2100	95.92	997	95.92	86.45	4.77	12357	16.71	12.94	14.82	13.65	11.34
2090 Manual	1304	Die.	15030	3120	6	4.625x5.000	504	2100	108.74	998	108.74	95.31	7.10	11655	15.40	12.23	13.41	12.69	10.73
2090 Power Shift	1295	Die.	15190	3160	6	4.625x5.000	504	2100	108.29	998	108.29	93.95	6.56	11211	14.94	11.77	12.49	11.96	10.14

2094 Powershift	1525	Die.	14750	560	6	4.625x5.000	504	2100	110.50	998	110.50	100.12	6.34	11910	15.40	12.26	13.81	12.93	11.27
2096 Powershift	1549	Die.	14940	760	6	4.016x4.724	359	2100	115.67	998	115.67	101.40	6.37	12915	17.38	14.01	15.21	13.92	11.95
2290 Manual	1296	Die.	15400	2630	6	4.625x5.000	504	2100	128.80	998	128.80	109.36	5.32	12635	14.52	11.66	12.46	11.73	10.07
2290 Powershift	1297	Die.	15840	2140	6	4.625x5.000	504	2100	129.08	998	129.08	111.68	6.25	12749	14.52	11.53	12.65	11.37	9.77
2294 Powershift	1526	Die.	15670	1280	6	4.625x5.000	504	2100	131.97	998	131.97	116.38	6.31	13017	14.86	11.82	13.11	12.21	10.51
2390 Powershift	1302	Die.	18710	3120	6	4.625x5.000	504	2100	160.72	1002	160.72	146.01	6.59	16020	15.23	12.41	13.20	12.66	10.99
2394 Powershift	1527	Die.	18595	2355	6	4.625x5.000	504	2100	162.15	1002	162.15	142.07	5.53	15497	15.46	12.70	13.42	12.71	11.04
2590 Powershift	1303	Die.	20500	4760	6	4.625x5.000	504	2100	180.38	1003	180.38	159.01	6.57	17865	15.53	12.97	13.42	13.03	11.67
2594 Powershift	1529	Die.	19790	3570	6	4.625x5.000	504	2100	182.07	1002	182.07	161.96	6.40	16874	15.22	12.88	13.37	12.94	11.63
2670	1165	Die.	25260	4450	6	4.625x5.000	504	2200	219.44	1008	219.44	194.60	5.28	23618	15.29	12.59	13.42	12.60	10.88
2870	1241	Die.	28150	3050	6	5.000x5.710	673	2200	252.10	1009	252.10	219.61	5.72	26386	15.45	12.01	12.98	12.37	10.40
3294 Powershift	1528	Die.	17980	0	6	4.625x5.000	504	2100	162.63	998	162.63	143.68	5.75	16242	15.32	12.58	13.55	12.76	11.13
M-B 4/94	1211	Die.	13110	4620	6	3.819x5.039	346	2550	73.33	1000	70.17	66.33	5.33	10558	15.13	10.68	12.55	11.65	9.49
4490	1328	Die.	22450	1610	6	4.625x5.000	504	2200	175.20	1000	175.20	153.30	5.65	21400	15.27	12.36	13.30	12.52	10.87
4690	1329	Die.	25230	2920	6	4.625x5.000	504	2200	219.62	1000	219.62	195.60	5.97	24564	15.26	12.76	13.39	12.84	11.21
4890	1330	Die.	28460	2710	6	5.00x5.71	673	2200	253.41	1000	253.41	224.81	5.96	27627	16.32	13.02	14.19	13.27	11.36
4994 Powershift	1530	Die.	39930	8615	8	5.00x5.51	866	2100	344.04	991	344.04	306.43	7.20	34519	17.03	13.81	14.67	13.87	12.18
John Deere																			
750 8 Speed	1504	Die.	2150	155	3	3.15x3.35	78.2	2400	18.54	540	19.80	15.73	6.41	1661	15.06	11.61	12.48	11.53	9.83
850	1280	Die.	3528	992	3	3.15x3.35	78	2600	22.27	540	20.66	18.92	4.90	2699	14.26	11.51	11.23	11.22	10.21
950	1281	Die.	3615	803	3	3.54x3.54	105	2400	27.36	540	28.05	23.46	4.98	3056	14.68	12.36	12.42	12.23	10.63
1050	1327	Die.	4140	730	3	3.54x3.54	105	2400	33.41	540	33.42	28.15	5.27	3466	15.46	12.36	12.34	11.99	10.13
1250	1437	Die.	5180	90	3	3.74x4.33	143	2500	40.70	540	40.98	34.01	5.39	3750	17.00	13.56	13.90	12.71	10.68
1450 9 Speed	1505	Die.	6570	1340	4	3.74x4.33	190	2400	51.39	540	50.93	43.79	7.68	5321	17.60	14.01	14.74	13.67	11.64
1650 9 Speed	1506	Die.	7785	2435	4	3.74x4.33	190	2300	62.22	540	62.70	54.06	7.79	6572	18.81	15.53	15.96	14.97	12.95
2040	1191	Die.	6420	1620	3	4.020x4.330	164	2500	40.86	540	37.62	34.15	5.64	4634	15.50	11.18	11.87	11.15	9.11
2040 8 Speed	1350	Die.	6500	1465	3	4.19x4.33	179	2500	41.25	540	40.53	33.31	5.63	4873	15.62	11.73	12.02	11.35	9.03
2040 8 Speed TSS (1)	1393	Die.	6040	265	3	4.19x4.33	179	2500	40.44	540	40.22	33.21	5.16	5541	14.87	10.93	11.69	10.71	8.76
2150 16 Speed	1469	Die.	5930	820	3	4.19x4.33	179	2500	46.47	540	46.13	38.69	6.98	4875	14.77	11.15	11.88	11.24	9.47
2240	1192	Die	7340	2390	3	4.19x4.33	179	2500	50.37	540	46.78	41.28	5.54	5433	15.20	11.08	11.57	11.18	9.51
2240 8 Speed TSS (1)	1394	Die.	6205	310	3	4.19x4.33	179	2500	50.90	540	49.20	42.13	5.08	5777	15.32	11.75	11.98	11.45	9.78
2350 16 Speed	1470	Die.	7190	380	4	4.19x4.33	239	2500	56.18	540	55.69	47.53	6.77	5688	15.67	11.66	12.96	11.87	9.87
2550 16 Speed	1471	Die.	8485	1575	4	4.19x4.33	239	2500	65.94	540	65.53	56.24	6.22	6979	15.42	11.85	12.83	12.09	10.10
2630	1157	Die.	8430	2630	4	4.190x5.000	276	2500	70.37	540	69.02	58.15	5.38	6470	16.01	10.89	12.10	10.98	8.95
2750 16 Speed	1472	Die.	9625	2125	4	4.19x4.33	239	2500	75.35	540	75.07	63.98	4.75	7581	16.11	12.29	13.13	12.37	10.51
2840	1249	Die.	10500	1695	6	4.020x4.330	329	2500	80.65	1000	76.27	67.47	6.21	8386	16.02	11.52	12.36	11.57	9.59
2940 16 Speed	1351	Die.	10650	1215	6	4.19x4.33	359	2500	81.17	1000	81.46	67.98	4.64	7601	15.91	11.73	12.81	11.91	9.91
2950 16 Speed	1473	Die.	11045	945	6	4.19x4.33	359	2500	85.37	1000	85.50	73.30	6.57	8768	16.33	12.21	13.58	12.45	10.53
4040	1267	Die.	12055	1165	6	4.25x4.75	404	2200	90.80	1002	90.80	77.85	6.36	8936	13.49	10.59	11.24	10.96	9.21
4040 Syncro Range	1359	Die.	12090	1600	6	4.25x4.75	404	2200	90.31	1002	90.31	77.04	8.14	9035	13.87	10.85	11.68	11.29	9.70
4040 Power Shift	1360	Die.	12080	1590	6	4.25x4.75	404	2200	90.79	1000	90.88	78.54	4.45	9195	13.54	10.79	11.50	11.35	9.55
4050 Quad	1474	Die.	13005	835	6	4.57x4.75	466	2200	101.49	1002	101.49	92.05	6.49	10331	15.12	11.72	13.44	12.54	10.64
4050 Powershift	1457	Die.	13030	310	6	4.57x4.75	466	2200	100.95	1002	100.95	88.75	7.88	11058	15.08	11.59	12.60	11.69	9.65
4240	1266	Die.	14090	1695	6	4.57x4.75	466	2200	110.94	1002	110.94	95.18	5.42	11492	14.33	11.09	12.05	11.35	9.52
4240 Syncro Range	1361	Die.	14240	2430	6	4.56x4.75	466	2200	110.81	1002	110.81	95.40	4.90	12240	14.17	11.08	12.00	11.47	9.81
4240 Power Shift	1362	Die.	14260	2440	6	4.56x4.75	466	2200	111.06	1000	111.43	95.65	4.51	12450	14.39	11.25	12.13	11.65	10.13
4250 Quad	1475	Die.	14990	1620	6	4.57x4.75	466	2200	120.21	1002	120.21	108.77	5.71	12858	15.70	12.21	13.90	12.82	10.64
4250 Powershift	1458	Die.	14970	1115	6	4.57x4.75	466	2200	120.86	1002	120.86	105.11	8.36	12802	15.78	12.33	13.44	12.08	10.17
4440	1265	Die.	15540	2270	6	4.57x4.75	466	2200	130.58	1002	130.58	112.56	5.02	13392	15.21	11.73	12.69	11.83	9.90
4440 Powershift	1357	Die.	15775	2655	6	4.57x4.75	466	2200	130.41	1010	130.41	114.16	4.53	13738	15.32	11.83	13.15	12.22	10.60
4450 Quad	1476	Die.	16680	2380	6	4.57x4.75	466	2200	140.33	1002	140.33	125.18	5.01	15069	16.36	13.08	14.42	13.45	11.61
4450 Quad (2)	1476	Die.	16760	2005	6	4.57x4.75	466	2200	140.33	1002	140.33	126.34	5.37	16278	16.36	13.08	14.68	....	....
4450 Powershift	1459	Die.	16745	1795	6	4.57x4.75	466	2200	140.43	1002	140.43	121.94	8.03	15014	16.15	12.94	13.63	12.58	10.60
4450 Powershift (2)	1459	Die.	16625	1225	6	4.57x4.75	466	2200	140.43	1002	140.43	122.51	8.78	16154	16.15	12.94	13.66	....	....
4640	1264	Die.	18120	None	6	4.57x4.75	466	2200	156.30	998	156.30	134.70	6.45	15362	15.61	12.29	13.30	12.15	10.32
4640 Power Shift	1358	Die.	18585	2805	6	4.57x4.75	466	2200	155.96	1000	157.01	137.04	4.81	15989	15.87	12.17	13.53	12.55	10.78
4650 Quad	1477	Die.	19615	1615	6	4.57x4.75	466	2200	165.70	998	165.70	145.58	6.45	16814	16.99	13.90	14.80	13.81	12.11
4650 Quad (2)	1477	Die.	19590	1150	6	4.57x4.75	466	2200	165.70	998	165.70	147.71	5.73	18931	16.99	13.90	14.93	....	....
4650 Powershift	1460	Die.	19660	1075	6	4.57x4.75	466	2200	165.52	998	165.52	143.33	8.12	16746	16.96	13.78	14.25	13.15	11.31
4650 Powershift (2)	1460	Die.	19740	695	6	4.57x4.75	466	2200	165.52	998	165.52	146.06	8.47	18794	16.96	13.78	14.44	....	....
4840	1263	Die.	20370	2240	6	4.57x4.75	466	2200	180.63	1000	181.63	157.09	4.76	17307	15.85	12.47	13.35	12.54	10.76

Ten-Year Summary of Test Reports, 1974-1984

						ENGINE											—FUEL CONSUMPTION (HP Hours Per Gallon) @:—			
																	PTO	—Varying Drawbar Power—		
MAKE AND MODEL OF TRACTOR	Test No.	Fuel Used	Weight With Ballast	Lbs. Ballast Carried	No. of Cyl-inders	Bore and Stroke	Dis-place-ment Cu. in.	Rated RPM Dwbr.	Max. PTO HP @ Rated Engine RPM	Std. PTO RPM	Max. PTO HP @ Std. PTO RPM	Max. Draw-bar HP	MPH @ Max. Dwbr. HP	Max. Lbs. Pull	Max. PTO HP @ Std. PTO RPM	Average @ Varying Power	Max. Avail-able Power	75% of Pull Max. Power	50% of Pull @ Max. Power
John Deere (cont.)																			
4850 Powershift	1461	Die.	21435	2715	6	4.57x4.75	466	2200	192.99	996	192.99	171.27	8.04	18789	17.47	14.50	14.68	13.80	12.01
4850 Powershift (2)	1461	Die.	21440	2280	6	4.57x4.75	466	2200	192.99	998	192.99	172.60	4.26	20810	17.47	14.50	14.93	....	....
8430	1179	Die.	23100	290	6	4.57x4.75	466	2100	178.16	993	178.16	160.39	5.56	22503	15.12	11.98	13.44	12.64	10.72
8440	1323	Die.	26590	None	6	4.57x4.75	466	2100	179.83	993	179.83	163.26	4.97	25383	15.86	12.55	14.29	13.06	11.25
8450	1436	Die.	29150	None	6	4.57x4.75	466	2100	186.98	993	186.98	175.73	4.50	26567	15.69	12.91	14.45	13.53	11.63
8630	1180	Die.	26480	1950	6	5.125x5.00	619	2100	225.59	993	225.59	202.31	4.58	26443	15.34	12.27	13.67	12.80	10.78
8640	1324	Die.	28270	None	6	5.125x5.00	619	2100	228.75	993	228.75	208.38	4.63	27782	15.61	12.40	14.06	13.14	11.16
8650	1435	Die.	30270	None	6	5.125x5.00	619	2100	238.56	993	238.56	221.80	5.55	28257	15.53	12.65	14.26	13.22	11.52
8850	1434	Die.	37700	None	8	5.51x5.00	955	2100	303.99	996	303.99	274.25	5.23	35330	15.74	12.82	14.06	13.34	11.65
(1) With mechanical front wheel drive. (2) Supplementary test with radial ply tires.																			
Deutz																			
D6206	1219	Die.	8780	3410	4	3.937x4.724	230	2050	60.23	540	57.00	52.41	6.04	6944	17.58	15.43	15.10	15.34	14.05
D6806	1220	Die.	11000	4605	4	3.937x4.724	230	2300	68.18	540	62.52	61.87	7.15	9095	16.55	14.73	14.63	15.05	13.52
DX-90	1305	Die.	13150	3210	5	3.94x4.72	287	2300	84.47	1000	80.82	74.19	6.53	8786	16.45	14.15	13.81	14.07	12.39
DX-110	1306	Die.	14940	2360	6	3.94x4.72	345	2300	100.29	1000	93.61	90.82	7.00	11773	15.10	13.71	13.52	14.03	12.60
DX-120	1405	Die.	14950	1980	6	4.02x4.92	374	2400	111.29	1000	101.90	97.41	7.32	12615	16.40	13.84	13.59	13.48	12.03
DX-130	1404	Die.	17630	3690	6	4.02x4.92	374	2300	121.27	1000	121.36	105.63	4.76	14406	17.63	13.77	14.14	13.10	11.26
DX-160	1307	Die.	18710	3870	6	4.02x4.92	374	2200	145.41	1000	140.99	124.81	6.41	15172	17.82	14.47	14.56	13.95	11.93
Fiat																			
420	1293	Die.	6035	2115	3	3.74x4.33	143	2200	41.34	540	37.45	37.71	5.65	5299	14.81	12.93	13.30	13.92	12.35
580	1292	Die.	9210	2580	3	4.055x4.33	168	2700	51.61	540	48.42	44.20	3.38	8899	14.93	12.59	12.14	12.70	10.50
780	1294	Die.	10230	2830	4	4.055x4.33	224	2500	70.36	540	66.30	64.43	4.06	7776	15.41	13.62	13.93	14.17	12.50
Ford																			
1510 (12x4) Manual	1500	Die.	3205	975	3	3.03x3.15	68.2	2800	19.72	540	20.45	16.99	6.92	1952	13.21	10.32	11.14	10.26	8.50
1510 (12x4) Synchro	1501	Die.	3200	915	3	3.03x3.15	68.2	2800	19.98	540	18.68	16.83	6.70	1900	13.50	10.29	10.97	10.27	8.57
1600	1228	Die.	3840	1150	2	3.54x3.94	77.6	2500	23.02	540	19.78	18.53	5.76	2634	14.14	11.82	11.26	11.45	9.72
1700	1325	Die.	3725	1110	2	3.54x3.94	77.6	2500	23.26	540	23.02	20.21	5.54	2801	13.02	11.21	10.89	11.48	10.41
1710 (12x4) Manual	1502	Die.	3510	1040	3	3.31x3.31	85.2	2700	23.88	540	22.19	21.02	7.06	2700	13.42	10.16	11.36	10.76	8.98
1710 (12x4) Synchro	1503	Die.	3530	1060	3	3.31x3.31	85.2	2700	23.79	540	22.34	21.23	5.68	2680	13.18	9.92	11.04	10.56	8.81
1900	1326	Die.	4160	1225	3	3.35x3.31	87.2	2600	26.88	540	25.68	23.49	6.20	2964	12.58	10.38	10.41	10.89	9.32
1910 (12x4) Manual	1507	Die.	4250	1270	3	3.346x3.937	103.9	2500	28.60	540	28.29	25.57	6.78	3340	12.79	10.32	11.14	10.86	9.17
1910 (12x4) Synchro	1508	Die.	4325	1285	3	3.346x3.937	103.9	2500	28.52	540	28.30	25.62	6.79	3449	12.61	10.36	10.99	10.78	9.09
2110 (12x4) Manual	1509	Die.	5105	1470	4	3.346x3.937	138.5	2500	34.79	540	34.91	30.80	7.01	3868	14.01	10.69	11.80	10.95	9.04
2110 (12x4) Synchro	1510	Die.	5110	1450	4	3.346x3.937	138.5	2500	35.11	540	35.56	31.11	6.99	3728	14.01	10.71	11.77	11.11	9.35
2600 6-Speed	1204	Die.	5990	1550	3	4.200x3.800	158	2000	32.38	540	30.51	27.93	5.57	4591	14.88	11.51	12.27	11.74	10.22
2600 6-Speed	1206	Gas.	6000	1645	3	4.200x3.800	158	2000	32.78	540	31.03	28.25	5.57	4198	11.14	7.89	8.83	8.17	6.73
2600 8-Speed	1222	Die.	6000	460	3	4.200x3.800	158	2000	32.47	540	30.76	28.18	5.56	4452	14.62	11.18	11.94	11.22	9.18
2600 8-Speed	1207	Gas.	6000	1710	3	4.200x3.800	158	2000	34.18	540	32.07	30.20	5.49	4455	11.54	8.38	9.45	8.64	7.15
2610 (8x2)	1421	Die.	5940	1780	3	4.20x4.20	175	2000	36.69	540	35.14	31.45	5.52	4473	16.15	12.82	13.03	12.71	10.51
2910 (8x2)	1491	Die.	5925	1295	3	4.20x4.20	175	2000	36.62	540	35.09	30.45	5.77	4237	16.04	12.51	13.18	12.31	11.95
2910 (8x4)	1492	Die.	5955	1305	3	4.20x4.20	175	2000	36.40	540	34.75	31.03	5.68	4223	15.95	12.58	13.00	12.24	10.59
3600 6-Speed	1203	Die.	6860	2445	3	4.20x4.20	175	2000	40.49	540	37.64	34.47	5.96	5114	15.32	12.12	12.84	12.34	9.97
3600 6-Speed	1208	Gas.	6900	2665	3	4.20x4.20	175	2000	40.17	540	37.91	35.53	5.91	5158	11.23	8.07	9.29	8.77	7.05
3600 8-Speed	1221	Die.	6890	1300	3	4.20x4.20	175	2000	40.55	540	38.31	34.10	5.96	5277	15.33	12.40	12.93	12.51	10.36
3600 8-Speed	1226	Gas.	6900	1500	3	4.20x4.20	175	2000	40.62	540	38.29	35.90	5.93	5123	11.42	8.16	9.02	8.57	6.88
3610 (8x2)	1422	Die.	6340	2070	3	4.40x4.20	192	2000	42.26	540	40.17	36.80	5.85	4964	15.95	12.65	13.37	12.69	11.20
3610 (8x4)	1423	Die.	6340	2045	3	4.40x4.20	192	2000	42.47	540	40.01	35.57	8.55	4917	16.26	12.94	12.85	12.44	10.53
3910 (8x2)	1493	Die.	6440	1760	3	4.40x4.20	192	2000	42.62	540	40.39	37.02	5.93	4931	15.86	12.46	13.33	12.66	10.71

3910 (8x4)	1494	Die.	6436	1736	3	4.40x4.20	192	2000	42.67	540	41.18	36.22	5.85	4934	15.64	12.63	13.16	12.34	10.59
4100 8-Speed	1202	Die.	7500	2580	3	4.20x4.40	183	2000	45.46	540	41.13	41.14	4.63	5557	15.59	11.57	12.57	11.96	10.36
4110 (8x2)	1424	Die.	7500	2850	3	4.40x4.40	201	2200	48.33	540	42.65	41.25	4.51	5681	16.37	12.64	13.26	12.34	10.76
4110 (8x4)	1425	Die.	7500	2785	3	4.40x4.40	201	2200	49.26	540	44.06	40.59	4.92	5691	16.06	12.32	12.92	12.13	10.44
4600 8-Speed	1223	Die.	8220	2340	3	4.40x4.40	201	2200	52.44	540	46.31	45.57	5.24	6342	14.59	11.49	11.82	11.85	10.77
4610 (8x2)	1426	Die.	8190	3095	3	4.40x4.40	201	2200	52.52	540	46.72	44.51	5.17	6402	16.78	13.17	13.96	13.25	11.60
4610 (8x4)	1427	Die.	8230	3085	3	4.40x4.40	201	2200	52.32	540	47.30	43.26	5.62	6534	16.83	13.05	13.53	12.77	11.18
5800 8-Speed	1201	Die.	9690	3785	4	4.20x4.20	233	2100	60.46	540	56.85	52.22	5.49	7105	15.77	12.83	12.87	12.88	11.02
5800 16-Speed	1227	Die.	9690	2380	4	4.20x4.20	233	2100	58.46	540	56.00	49.79	5.36	7140	15.06	11.94	12.07	11.94	10.42
5610 (16x4)	1428	Die.	9700	2325	4	4.40x4.20	256	2100	62.54	540	60.58	54.63	5.69	7408	15.57	12.38	12.82	12.44	10.30
5610 (16x8)	1429	Die.	9545	3130	4	4.40x4.20	256	2100	62.57	540	59.99	53.70	6.57	7578	15.45	12.11	12.93	12.03	10.09
6600 8-Speed	1217	Die.	9860	3780	4	4.40x4.20	256	2100	70.56	1000	70.07	61.36	6.91	7131	15.43	12.86	12.28	12.71	11.35
6600 16-Speed	1224	Die.	9700	2680	4	4.40x4.20	256	2100	68.10	1000	68.05	58.74	5.22	7267	14.97	12.64	12.05	12.77	11.05
6610 (16x4)	1430	Die.	9700	2270	4	4.40x4.40	268	2100	72.13	540	68.27	61.17	5.62	7887	15.64	13.14	13.40	12.90	10.77
6610 (16x8)	1431	Die.	9700	2850	4	4.40x4.40	268	2100	72.30	540	69.20	62.64	6.49	7948	15.43	12.91	13.18	12.84	10.87
6700 16-Speed	1244	Die.	9690	1180	4	4.40x4.20	256	2100	68.94	1000	68.62	58.06	7.55	6787	13.77	12.23	11.24	12.38	11.16
7600 16-Speed	1225	Die.	10760	3320	4	4.40x4.20	256	2100	84.79	1000	85.16	67.95	5.61	7779	15.95	12.35	12.44	11.77	9.92
7610 (16x4)	1432	Die.	10800	2220	4	4.40x4.40	268	2100	86.95	1000	86.79	74.22	5.53	8804	15.75	12.44	13.36	12.29	10.35
7700 16-Speed	1242	Die.	10800	2400	4	4.40x4.20	255	2100	84.38	1000	84.29	71.57	7.28	7688	15.24	11.65	11.92	11.21	9.71
7710 (16x8)	1433	Die.	10800	2150	4	4.40x4.40	268	2100	86.62	1000	86.55	73.24	6.42	8638	15.87	12.60	13.67	12.26	10.35
8700 16-Speed	1245	Die.	14760	2490	6	4.40x4.40	401	2300	110.58	1000	99.56	100.12	6.94	11581	15.02	11.91	12.37	12.28	10.93
9700 16-Speed	1243	Die.	17480	4620	6	4.40x4.40	401	2200	135.64	1000	129.25	118.06	6.55	15010	15.95	11.77	12.63	11.97	10.34
TW-5	1514	Die.	14430	1340	6	4.40x4.40	401	2300	105.74	1000	96.83	95.27	6.52	12249	15.52	12.42	13.14	12.91	11.38
TW-10	1301	Die.	15190	2325	6	4.40x4.40	401	2300	110.24	1000	101.09	97.35	5.23	12006	14.86	11.50	12.17	11.91	10.20
TW-15	1515	Die.	16010	2755	6	4.40x4.40	401	2200	121.40	1000	117.83	107.24	8.09	13247	16.90	12.39	13.83	12.80	10.88
TW-15 FWD (2)	1536	Die.	16680	2310	6	4.40x4.40	401	2200	121.25	1000	115.58	107.35	5.21	15939	16.95	12.39	13.96	12.65	10.68
TW-20	1300	Die.	17180	3945	6	4.40x4.40	401	2200	135.60	1000	131.43	121.47	7.85	14155	16.22	11.78	13.08	12.04	10.09
TW-25	1516	Die.	17965	2530	6	4.40x4.40	401	2200	140.68	1000	135.70	126.73	5.25	14871	16.66	12.58	13.89	13.02	11.20
TW-30	1299	Die.	19830	5205	6	4.40x4.40	401	2200	163.28	1000	157.04	144.17	8.32	16553	16.76	12.49	13.67	12.58	10.79
TW-35	1517	Die.	20270	4090	6	4.40x4.40	401	2200	170.30	1000	166.67	147.49	5.30	17054	17.41	13.81	14.31	13.91	12.18
TW-35 FWD (2)	1537	Die.	20270	3130	6	4.40x4.40	401	2200	171.12	1000	162.55	147.55	5.44	18823	17.58	14.09	14.42	13.71	12.04
FW-20	1291	Die.	31000	1385	8	4.625x4.125	555	2850	....	....	....	156.85	5.45	27155	....	....	12.12	11.69	10.15
FW-30	1288	Die.	31720	410	8	5.500x4.750	903	2600	(1)	....	....	212.02	6.64	27803	....	....	13.71	12.24	10.08
FW 30 without PTO												220.36	5.85	28302	....	....	14.16	12.73	10.96
FW40	1290	Die.	32950	2320	8	5.500x4.750	903	2600	....	....	....	236.76	6.60	28245	....	....	13.83	12.84	10.73
FW60	1289	Die.	33970	2870	8	5.500x4.750	903	2600	....	....	....	265.57	7.45	29304	....	....	14.90	13.38	11.27

(1) Equipped with controlled, hydrostatic pto with 105 output horsepower at 1000 rpm. (2) Drawbar test with front wheel assist engaged.

Hesston Fiat

466 12 Speed	1484	Die.	6670	950	3	3.94x4.33	158	2500	45.13	540	42.68	40.03	5.79	(1)	16.74	12.41	13.66	12.87	10.95
480-8 DT and 480-8 12 & 8 Speed	1365	Die.	7805	2485	3	3.94x4.33	158	2500	42.58	540	40.38	37.07	5.07	5265	16.93	12.27	13.34	12.54	10.64
60-66 DT	1531	Die.	7460	1580	3	4.094x4.527	178.8	2500	51.49	540	48.51	45.51	5.53	3031	17.13	13.11	14.19	13.30	11.38
666 12 Speed	1485	Die.	8715	2425	4	3.94x4.33	211	2500	62.40	540	60.33	54.31	5.51	(2)	17.00	13.00	13.79	13.20	11.73
680DT & 680 8 Speed	1362	Die.	10000	2660	4	3.94x4.33	211	2500	62.47	1000	61.20	53.65	5.44	6252	17.40	14.19	14.80	14.20	12.45
780 DT and 780 8-Speed	1366	Die.	10100	3920	4	4.055x4.33	224	2500	70.57	540	66.67	62.06	7.61	6865	16.71	13.96	13.72	13.86	12.26
80-66 DT	1532	Die.	9400	2685	4	4.094x4.527	238.5	2500	70.43	1000	68.91	62.73	5.47	4260	17.60	14.08	14.96	14.21	12.66
880 DT-5 & 880-5 12 Speed	1353	Die.	11560	2810	5	4.055x4.331	280	2500	81.32	1000	80.95	70.73	7.63	7554	16.27	13.23	13.50	13.44	11.65
980DT & 980 16 Speed	1354	Die.	12645	3795	6	3.937x4.33	316	2400	91.12	996	91.12	77.42	5.00	8351	16.90	13.92	14.25	13.59	12.25
1180 DT Turbo	1450	Die.	16885	1935	6	4.055x4.33	335	2550	107.46	1000	104.22	93.71	4.37	12905	16.40	12.54	14.16	12.74	10.42
1380DT, 1380	1409	Die.	16995	1795	6	4.055x4.33	335	2400	123.16	1000	123.54	104.97	8.08	13105	16.49	13.30	13.60	13.01	11.62
140-90 DT Turbo	1533	Die.	16425	375	6	4.094x4.527	358	2500	123.35	1000	122.83	105.81	5.05	12687	17.12	13.04	14.40	13.16	11.13
1580DT Turbo	1451	Die.	19060	2460	6	4.528x5.118	494	2200	141.44	1000	136.14	124.15	5.48	15342	17.28	13.49	14.70	13.53	11.47
160-90 DT Turbo	1534	Die.	18370	1075	6	4.528x5.118	494	2200	141.71	1000	143.91	122.23	5.32	13848	17.53	13.61	14.38	13.62	11.84
1880DT, 1880	1410	Die.	19710	3020	6	4.528x5.118	494	2200	162.48	1000	159.83	138.81	5.44	15656	17.35	13.87	14.53	13.58	12.07
180-90 DT Turbo	1535	Die.	19725	2430	6	4.528x5.118	494	2200	162.87	1000	158.68	140.45	6.40	14713	17.86	14.13	14.82	14.25	12.29

(1) 2WD, 4969; 4WD, 5833. (2) 2WD, 6611; 4WD, 7433.

International Harvester

Hydro 84	1316	Die.	8120	3115	4	3.937x5.062	246	2400	58.73	540	58.68	43.59	7.60	8672	14.01	10.50	10.13	9.82	8.34
Hydro 86	1337	Die.	10710	2545	6	3.875x4.375	310	2400	70.89	540	66.64	54.10	4.03	8815	14.18	10.23	9.92	9.55	8.24

Ten-Year Summary of Test Reports, 1974-1984

						ENGINE										—FUEL CONSUMPTION (HP Hours Per Gallon) @:—			
																PTO	—Varying Drawbar Power—		
MAKE AND MODEL OF TRACTOR	Test No.	Fuel Used	Weight With Ballast	Lbs. Ballast Carried	No. of Cylinders	Bore and Stroke	Displacement Cu. in.	Rated RPM Dwbr.	Max. PTO HP @ Rated Engine RPM	Std. PTO RPM	Max. PTO HP @ Std. PTO RPM	Max. Drawbar HP	MPH @ Max. Dwbr. HP	Max. Lbs. Pull	Max. PTO HP @ Std. PTO RPM	Average @ Varying Power	Max. Available Power	75% of Pull Max. Power	50% of Pull @ Max. Power
International Harvester (cont.)																			
Hydro 100	1158	Die.	12765	635	6	4.300x5.000	436	2400	104.17	1000	101.30	82.13	6.42	9801	14.83	10.50	10.35	10.19	8.95
Hydro 186	1257	Die.	13430	295	6	4.300x5.000	436	2400	105.02	1000	100.31	82.77	6.56	11312	13.68	10.06	9.83	9.83	8.46
284	1277	Gas.	3596	1166	4	2.756x2.992	71.3	2600	25.75	1000	24.33	20.64	4.02	2561	11.62	9.54	9.77	8.97	7 52
284 8 Speed	1387	Die.	3600	860	3	3.27x3.94	99	2600	27.47	540	23.92	23.52	5.71	2523	14.40	10.91	10.99	10.53	9.18
484 Utility	1312	Die.	7710	2710	3	3.875x5.06	179	2200	42.42	540	41.79	38.06	4.78	5500	14.81	11.85	12.75	12.39	10.63
584 Utility & Rowcrop	1313	Die.	8850	3185	4	3.875x4.38	206	2300	52.54	540	50.96	47.47	5.07	6859	15.23	12.34	13.41	12.95	11.10
684 Utility & Rowcrop	1314	Die.	9660	3825	4	3.875x5.06	239	2400	62.52	540	58.75	55.92	5.29	6858	15.55	12.21	13.27	13.02	11.28
686 10 Speed	1336	Die.	10340	2360	6	3.875x4.375	310	2000	66.36	543	66.36	58.81	5.08	8043	16.07	13.16	13.93	13.27	11.53
784 Rowcrop	1315	Die.	9920	3830	4	3.937x5.062	246	2400	67.48	1000	64.09	58.65	5.18	8105	16.06	12.75	13.25	12.77	11.07
786 16 Speed	1388	Die.	11930	340	6	3.875x5.0625	358	2400	80.20	1000	77.41	70.25	4.74	9968	15.72	11.40	12.72	11.88	10.00
884 Rowcrop	1376	Die.	10150	3945	4	3.937x5.51	268	2400	72.91	1000	69.76	65.39	5.54	8116	15.76	12.47	13.48	12.91	11.05
886	1254	Die.	13040	970	6	3.875x5.065	360	2400	86.14	1000	83.16	76.16	4.70	10485	14.29	10.55	11.77	10.92	9.21
886 16 Speed	1338	Die.	13450	1710	6	3.875x5.063	358	2400	86.57	1000	83.91	76.25	4.69	10807	16.01	11.77	12.97	12.21	10.62
886 16 Speed (1)	1339	Die.	13450	1710	6	3.375x5.063	358	2400	90.56	1000	88.23	80.13	4.69	10930	15.84	11.98	12.81	12.38	10.86
(1) Serial No. 2490208 U17026 and up.																			
986	1255	Die.	14000	970	6	4.30x5.00	436	2400	105.68	1000	104.18	94.60	4.98	12176	15.56	11.34	12.65	11.72	10.02
1066 Turbo	1124	Die.	15260	1945	6	4.30x4.75	414	2600	125.68	1000	119.20	108.87	7.03	13000	16.37	11.32	12.78	11.97	9.99
1086 w/Radial Tires	1247	Die.	15640	2915	6	4.30x4.75	414	2400	131.41	1000	133.67	116.28	4.40	13503	16.39	11.90	13.28	12.36	10.45
1066 w/Bial Ply Tires	1247	Die.	15640	3100	6	4.30x4.75	414	2400	131.41	1000	133.67	114.14	6.66	12137	16.39	11.90	12.83	12.08	10.52
1566 Turbo	1174	Die.	18260	3065	6	4.30x5.00	436	2600	161.01	1000	162.31	140.35	5.64	15774	16.16	11.51	12.55	11.69	9.86
1568	1175	Die.	17350	2400	8	4.500x4.313	550	2600	150.70	1000	147.79	133.79	5.69	14918	14.99	12.08	13.00	12.59	10.80
1586 w/Radial Tires	1248	Die.	17600	2480	6	4.30x5.00	436	2500	161.55	1000	156.09	140.65	5.55	16665	16.51	12.28	13.02	12.38	10.51
1586 w/Bias Ply Tires	1248	Die.	17600	3010	6	4.30x5.00	436	2500	161.55	1000	156.09	140.08	6.05	15124	16.51	12.28	12.74	12.38	10.54
3088 16 Sp.	1551	Die.	12500	560	6	3.875x5.062	358	2400	81.35	1000	80.28	71.20	5.16	5100	16.03	11.36	12.84	11.59	9.76
3288	1438	Die.	13560	1800	6	3.875x5.062	358	2400	90.46	1000	88.33	80.72	6.11	11486	15.94	11.69	13.16	12.31	10.27
3388	1319	Die.	17850	430	6	4.30x5.00	436	2400	130.61	1000	128.59	114.42	6.67	16764	16.85	12.00	13.52	12.17	10.09
3488 Hydro	1439	Die.	13940	1060	6	4.30x5.35	466	2400	112.56	1000	107.11	83.43	6.50	12152	15.28	10.64	10.00	9.73	8.43
3588	1320	Die.	18890	1270	6	4.30x5.35	466	2400	150.41	1000	152.07	130.94	6.65	17589	16.98	12.19	13.13	12.20	10.30
3688	1440	Die.	14335	1135	6	4.30x5.00	436	2400	113.72	1000	112.48	100.28	7.36	12250	15.75	11.82	13.30	12.35	10.38
3788 12 Speed	1377	Die.	20820	2200	6	4.30x5.35	466	2500	170.57	1000	166.39	146.43	7.49	19069	17.12	12.22	13.24	12.25	10.06
4386	1256	Die.	24930	None	6	4.30x5.35	466	2600	....	....	....	176.02	8.71	23321	....	....	12.43	11.92	10.18
4568	1216	Die.	29870	4120	8	5.31x4.50	798	2600	....	....	....	235.72	6.76	27995	....	....	12.89	11.79	9.73
4786	1317	Die.	34350	4150	8	5.31x4.50	798	2600	....	....	....	265.55	4.79	33468	....	....	12.80	11.92	9.86
5088 (2)	1419	Die.	16250	240	6	4.30x5.00	436	2400	136.12	1005	136.12	121.17	5.06	14960	15.32	11.65	13.23	12.04	9.90
5288	1420	Die.	18585	1530	6	4.30x5.35	466	2400	162.60	1005	162.60	142.37	5.27	17577	16.07	12.62	13.70	12.77	10.75
5488	1441	Die.	20005	2765	6	4.30x5.35	466	2400	187.22	1005	187.22	164.82	5.27	18646	16.20	13.00	14.16	13.15	11.21
(2) Drawbar information is from test run with radial ply tires.																			
Kubota																			
L185	1285	Die.	3370	1430	2	3.000x3.23	45.3	2800	15.33	540	14.07	13.03	5.57	1939	13.60	10.90	10.38	10.82	9.26
L185DT	1286	Die.	3415	1283	2	3.000x3.23	45.3	2800	15.45	540	14.16	12.58	3.74	1871	13.49	11.00	10.22	10.53	9.04
L235	1406	Die.	3715	1280	3	3.00x3.23	68	2600	19.59	540	19.63	16.05	4.68	2440	14.33	11.34	11.33	10.85	9.23
L245	1283	Die.	3694	1496	3	3.00x3.23	68	2800	22.06	540	20.11	18.66	5.74	2067	13.98	11.07	10.74	10.70	9.16
L245DT	1284	Die.	3792	1410	3	3.00x3.23	68	2800	22.35	540	20.15	18.55	5.78	1903	14.33	11.21	10.97	10.61	9.37
L275	1407	Die.	4055	1430	3	3.23x3.23	79.3	2600	23.42	540	23.01	19.70	4.84	2717	14.57	11.55	11.62	11.07	9.95
L285	1198	Die.	4030	1585	4	2.992x3.228	91	2400	26.45	540	23.58	22.94	6.62	3134	14.63	12.16	11.78	12.16	10.65
L295DT and L295 8 Speed	1370	Die.	4700	1305	3	3.23x3.23	79.3	2800	26.46	540	24.91	22.82	4.34	3155	14.59	11.75	11.57	11.39	9.58
L305DT and L305 8 Speed	1371	Die.	5360	2070	3	3.23x3.23	79.3	2800	26.21	540	25.14	22.96	4.16	3918	13.83	11.14	11.15	11.13	9.46
L345DT and																			

L345 8 Speed	1372	Die.	5435	2000	4	3.00x3.23	90.7	2800	29.35	540	28.80	26.72	4.62	3795	12.76	10.58	10.68	10.81	9.15
M4050DT and M4050 8 Speed	1495	Die.	7215	2275	6	3.23x3.23	158.5	2600	45.74	540	42.10	37.61	5.99	(1)	15.06	11.57	11.67	11.52	9.88
M4500DT & M4500 16 Speed	1348	Die.	7800	2635	6	3.23x3.23	158.5	2600	49.72	540	44.49	42.50	6.16	4812	15.19	12.22	11.90	12.02	10.77
M4950DT & M4950 12 Speed	1496	Die.	8195	2395	6	3.35x3.23	170	2600	49.57	540	45.47	41.43	4.68	(2)	14.70	11.21	11.49	11.15	9.26
M5500DT and M5500 16 Speed	1369	Die.	8710	3210	3	4.134x4.528	182	2400	53.99	540	49.18	46.96	5.51	6287	16.22	12.44	13.05	12.77	11.05
M5950DT & M5950 12 Speed	1497	Die.	9220	3100	3	4.29x4.53	196	2400	58.00	540	52.81	49.29	5.09	(3)	17.08	13.44	13.64	13.53	11.83
M6950DT & M6950 12 Speed	1498	Die.	9575	2530	4	4.13x4.53	243	2400	66.44	540	63.96	56.74	5.02	(4)	16.98	13.26	13.72	13.28	11.33
M7500DT & M7500 16 Speed	1349	Die.	9510	3530	4	4.13x4.53	243	2400	72.34	540	66.54	61.29	6.65	6327	17.83	14.15	13.93	14.20	12.40
M7950DT & M7950 12 Speed	1499	Die.	10305	3205	4	4.29x4.53	262	2400	75.44	540	69.32	65.24	5.26	(5)	17.14	13.57	13.88	13.82	11.93
(1) M4050, 4259; M4050DT, 6070. (2) M4950, 5292; M4950DT, 6750. (3) M5950, 5749; M5950DT, 8350. (4) M6950, 6517; M6950DT, 8465. (5) M7950, 7244; M7950DT, 9641.																			
Lamborghini																			
1056DT	1269	Die.	12050	1700	6	3.86x4.72	331	2220	92.13	1000	89.98	79.51	6.86	9135	15.16	13.02	12.45	12.74	10.93
Leyland																			
245	1177	Die.	7850	1970	3	3.600x5.000	152.7	2250	39.73	540	36.38	35.09	4.47	5056	16.30	12.60	13.02	12.67	11.29
255	1176	Die.	8610	2310	4	3.858x4.921	230	2200	47.91	540	43.85	43.00	6.58	5891	16.42	11.10	12.78	11.81	9.50
472 & 272 9 Speed	1341	Die.	11990	4580	4	3.858x4.921	230	2200	63.52	540	58.50	53.27	5.91	7224	14.97	12.28	11.32	11.67	10.48
482 & 282 9 Speed	1340	Die.	12000	4590	4	3.858x4.921	230	2200	74.28	540	70.86	61.19	5.86	7032	17.58	12.63	12.70	12.10	10.09
2100	1178	Die.	13260	4350	6	3.860x4.920	344.7	2100	88.40	1000	83.30	75.70	4.95	8617	16.29	13.20	13.16	13.24	11.24
Long																			
360	1298	Die.	6410	1930	3	3.74x4.33	143	2400	36.16	540	31.06	31.91	5.20	4808	14.41	11.97	12.45	12.13	10.48
510	1415	Die.	8210	3925	3	4.02x4.33	164.5	2400	49.15	540	46.91	43.27	5.14	6040	15.74	13.48	13.15	13.52	12.24
510DTC	1416	Die.	9100	3835	3	4.02x4.33	164.5	2400	49.35	540	46.41	41.37	4.63	5635	16.47	13.72	13.68	13.30	11.69
610	1417	Die.	8985	4290	4	4.02x4.33	219	2400	64.33	540	60.57	57.48	5.37	7018	15.93	13.46	13.58	13.51	11.92
900 and 910	1163	Die.	12575	4375	4	4.33x4.72	278	2200	72.88	1000	72.86	62.50	6.53	7843	13.06	12.15	10.97	13.00	11.38
Massey-Ferguson																			
MF154-4	1411	Die.	6820	1615	3	3.60x5.00	152	2250	42.52	540	40.38	35.40	4.52	4144	17.26	13.41	13.79	13.00	11.42
MF164-4 12 Speed	1392	Die.	7775	1395	4	3.875x5.0	236	2200	62.45	540	59.56	52.38	7.13	5500	16.41	12.37	12.61	12.11	10.69
MF205 6 Speed	1363	Die.	2840	935	2	3.46x3.46	65.2	2400	16.56	540	16.34	13.45	4.39	1995	12.97	9.62	9.98	9.65	8.03
MF205-4 6 speed	1364	Die.	3120	905	2	3.46x3.46	65.2	2400	16.40	540	16.18	13.57	4.86	2131	12.83	9.69	10.04	9.57	8.02
MF210 12 Speed	1365	Die.	3550	1090	2	3.62x3.74	77.1	2500	21.96	540	21.23	18.08	5.81	2159	13.61	11.04	10.84	10.53	9.36
MF210-4 12 Speed	1366	Die.	3765	1030	2	3.62x3.74	77.1	2500	21.77	540	21.02	17.60	6.91	2158	13.18	10.75	9.97	10.44	8.61
MF220 12 Speed	1367	Die.	4220	1455	2	3.82x3.94	90.3	2500	26.37	540	25.52	23.95	4.34	3287	13.36	11.07	11.22	11.60	10.17
MF220-4 12 Speed	1368	Die.	4487	1307	2	3.82x3.94	90.3	2500	26.48	540	26.06	22.91	3.84	3496	14.09	11.56	11.09	11.55	10.02
MF230	1215	Gas.	4870	1030	4	3.375x4.062	145	2000	34.34	540	31.29	29.58	5.08	3717	11.85	8.72	9.89	8.90	7.85
MF230	1214	Die.	5110	1110	3	3.60x5.00	153	2000	34.53	540	30.80	29.66	7.64	4030	18.18	14.81	15.06	14.74	12.87
MF235	1194	Gas.	5785	1655	4	3.375x4.062	145	2250	41.13	540	33.87	35.29	5.86	4294	10.49	7.99	8.69	8.07	6.69
MF235	1187	Die.	5860	1725	3	3.60x5.00	152	2250	42.39	540	35.29	36.29	5.84	4281	16.78	13.52	13.80	13.39	11.56
MF240 8 Sp.	1519	Die.	4985	770	3	3.60x5.00	152	2000	34.77	540	31.89	29.39	5.30	3824	16.10	13.18	13.72	13.35	11.59
MF245	1251	Die.	6150	2100	3	3.60x5.00	152	2250	42.90	540	36.50	36.75	5.92	4279	16.25	12.72	12.43	12.79	11.13
MF245	1252	Gas.	6020	2120	4	3.375x4.062	145	2250	41.09	540	34.15	35.50	5.90	4298	11.74	9.07	9.50	9.07	7.88
MF250 8 Sp.	1520	Die.	5760	1175	3	3.60x5.00	152	2250	40.86	540	36.93	35.07	5.81	4297	15.80	12.38	12.92	12.50	10.72
MF254 12 Speed	1478	Die.	7275	1790	3	3.60x5.00	152	2250	43.36	540	40.71	35.14	5.82	3844(1)	16.58	13.43	12.84	12.51	10.62
MF255	1190	Gas.	7280	1140	4	3.875x4.500	212	2000	50.01	540	47.14	43.49	5.28	5668	10.91	8.00	8.94	8.54	6.72
MF255	1189	Die.	7130	1160	4	3.600x5.000	203	2000	50.69	540	45.55	43.72	5.28	5257	15.88	13.32	13.44	13.36	12.24
MF255 12-Speed	1250	Die.	7310	895	4	3.875x5.00	236	2000	52.68	540	48.37	44.75	7.89	5591	16.92	12.70	13.34	12.82	11.03
MF265	1188	Die.	8200	1815	4	3.875x5.00	236	2000	60.73	540	54.76	51.87	5.23	6248	15.88	13.44	13.52	13.51	12.16
MF270 8 Sp.	1521	Die.	8195	1295	4	3.875x5.00	236	2000	55.85	540	52.75	47.08	4.96	5896	16.79	12.99	13.44	13.10	11.22
MF274 12 Speed	1479	Die.	8190	2205	4	3.875x5.00	236	2200	55.39	540	54.26	46.76	6.56	4719(2)	17.25	12.80	13.76	12.66	10.59
MF275	1193	Die.	9330	2720	4	3.975x5.000	248	2000	67.43	540	61.76	60.16	5.16	7292	14.18	12.51	13.04	13.22	11.63
MF285	1171	Die.	11760	4110	4	4.500x5.000	318	2000	81.96	1000	81.96	70.53	7.77	8846	14.98	12.68	12.85	12.90	11.34
MF290 12 Sp.	1522	Die.	9070	3130	4	3.975x5.00	248	2200	65.92	540	59.37	56.36	6.44	7654	16.58	12.75	13.24	12.76	10.98
MF294 12 Speed	1480	Die.	8645	1925	4	3.975x5.00	248	2100	67.39	540	64.94	56.28	5.77	5665(3)	17.58	14.53	14.68	13.95	12.54
MF298 8 Sp.	1523	Die.	11040	3070	4	4.50x5.00	318	2000	79.54	1000	73.66	69.74	5.14	8712	16.31	12.88	13.47	13.14	11.55

Ten-Year Summary of Test Reports, 1974-1984

					ENGINE										—FUEL CONSUMPTION (HP Hours Per Gallon) @:—			
																PTO	—Varying Drawbar Power—	
MAKE AND MODEL OF TRACTOR	Test No.	Fuel Used	Weight With Ballast	Lbs. Ballast Carried	No. of Cylinders	Bore and Stroke	Displacement Cu. in.	Rated RPM Dwbr.	Max. PTO HP @ Rated Engine RPM	Std. PTO RPM	Max. PTO HP @ Std. PTO RPM	Max. Drawbar HP	MPH @ Max. Dwbr. HP	Max. Lbs. Pull	Max. PTO HP @ Std. PTO RPM	Average @ Varying Power	Max. Available Power	75% of Pull Max. Power	50% of Pull @ Max. Power
Massey-Ferguson (cont.)																			
MF298 12 Sp.	1524	Die.	10950	2935	4	4.50x5.00	318	2000	79.26	1000	74.25	67.85	7.73	8663	15.72	11.93	12.40	12.39	10.79
MF670 & 270 12 Sp.	1538	Die.	9200	480	4	3.875x5.00	236	2000	55.62	1000	51.44	46.05	4.87	6382	16.39	12.37	12.93	12.10	10.26
MF690 12 Sp.	1539	Die.	10295	2275	4	3.975x5.00	248	2200	65.68	540	62.25	54.78	4.77	7650	15.51	11.96	12.01	11.79	9.82
MF698 12 Sp.	1540	Die.	12125	2185	4	4.50x5.00	318	2000	78.83	540	74.41	68.38	4.56	8707	15.91	11.91	12.55	12.24	10.59
MF699 12 Sp.	1541	Die.	12935	2610	6	3.875x5.000	354	2200	85.79	540	78.00	71.71	4.69	8712	16.96	12.87	13.51	12.66	10.64
MF1505	1172	Die.	20970	3010	8	4.500x5.000	636	2800	174.46	1000	175.95	154.10	6.98	17226	14.55	11.41	12.27	11.43	9.54
MF1805	1173	Die.	22790	4790	8	4.500x5.000	636	2800	192.65	1000	191.60	170.17	6.95	18781	14.77	12.14	12.76	12.41	10.77
MF2640 16 Speed	1481	Die.	16380	3945	6	3.875x5.00	354	2400	90.95	1000	87.60	74.83	6.58	10623(4)	15.81	11.67	12.15	11.46	9.70
MF2675, 8-Speed	1321	Die.	14280	1930	6	3.875x5.00	354	2500	100.84	1000	95.00	86.18	5.91	10226	15.00	11.14	11.48	11.57	10.01
MF2675, 24-Speed	1309	Die.	14495	2065	6	3.875x5.00	354	2500	103.29	1000	96.67	87.47	5.09	9674	15.43	11.56	11.76	11.49	9.95
MF2705, 8-Speed	1322	Die.	16800	4295	6	3.875x5.00	354	2500	121.11	1000	114.44	101.47	6.17	12588	16.84	11.22	12.54	11.30	9.45
MF2705, 24-Speed	1310	Die.	17490	4895	6	3.875x5.00	354	2500	122.20	1000	115.85	104.23	5.30	13085	16.65	11.22	12.74	11.27	9.23
MF2745	1311	Die.	19490	4300	8	4.25x4.75	539	2600	143.40	1000	132.21	125.17	5.51	15386	15.40	10.62	11.96	11.13	9.39
MF2775	1278	Die.	20440	4210	8	4.63x4.75	640	2600	165.95	1000	149.86	143.70	5.72	17407	16.05	11.50	12.57	11.52	9.85
MF2775 8 Speed	1389	Die.	20170	4365	8	4.63x4.75	640	2600	162.09	1000	146.87	139.68	5.73	16766	15.78	11.19	12.45	11.68	9.56
MF2805 24-Speed	1258	Die.	21170	5540	8	4.63x4.75	640	2500	194.62	1000	181.77	160.72	7.10	17369	16.29	11.33	12.21	11.14	9.27
MF2805 8 Speed	1399	Die.	21430	5395	8	4.63x4.75	640	2500	190.81	1000	186.29	164.58	5.41	17647	16.59	10.97	12.41	11.43	9.58
MF3505 16 Sp.	1511	Die.	13195	260	6	3.875x5.00	354	2400	91.50	1000	87.47	74.79	6.54	8344	15.53	11.40	11.55	10.90	9.19
MF3525 16 Sp.	1512	Die.	14645	1545	6	3.875x5.00	354	2400	108.01	1000	103.67	91.22	6.45	9322	16.67	11.65	12.65	11.53	9.31
MF3545 16 Sp.	1513	Die.	17235	3935	6	3.875x5.00	354	2400	126.72	1000	122.15	105.16	6.82	10563	17.01	12.11	12.86	11.47	9.64
MF4800 12 & 18 Speed	1342	Die.	30520	None	8	5.5x4.75	903	2600	179.31	1000	172.88	159.08	4.82	25294	15.10	10.12	12.13	10.73	8.39
MF4840 12 & 18 Speed	1343	Die.	30920	None	8	5.5x4.75	903	2600	210.67	1000	210.61	186.36	4.84	28191	15.57	10.77	12.41	11.25	9.32
MF4880 12 & 18 Speed	1344	Die.	32450	1360	8	5.5x4.75	903	2600	272.81	1000	267.38	244.57	6.54	29272	16.80	11.51	13.50	11.98	9.58
MF-4900 18 Speed	1391	Die.	33940	2975	8	5.5x4.75	903	2600	320.55	1000	323.88	278.78	6.53	30090	16.80	11.95	13.26	11.82	9.87
Minneapolis-Moline																			
G955	1161	Die.	12060	None	6	4.375x5.000	451	1800	96.38	1000	98.82	83.40	5.44	8374	13.92	11.93	11.26	11.76	10.29
Same																			
Panter 4WD	1185	Die.	12000	2772	5	3.860x4.720	276	2200	80.02	1000	79.10	66.67	5.75	10389	14.79	12.74	12.40	12.30	10.00
Tiger 100	1268	Die.	11620	2500	5	4.13x4.72	317	2200	90.45	1000	89.42	78.84	6.35	9116	15.48	13.22	12.41	13.08	11.26
Buffalo 4WD	1186	Die.	13795	3708	6	4.130x4.720	380	2200	104.94	1000	104.94	88.24	4.24	10941	15.23	12.78	12.47	12.44	10.76
Satoh																			
S750DD & S750D 9 Speed	1347	Die.	5550	1620	3	3.386x4.016	108.4	2500	33.45	540	28.11	28.99	5.93	4295	11.92	10.89	9.86	11.18	9.58
Steiger																			
Wildcat III ST-210 & RC-210	1237	Die.	22260	None	8	4.500x5.000	636	2800	....	....	....	171.44	5.84	21052	....	....	12.71	12.58	10.82
Bearcat II	1162	Die.	23020	1585	8	4.500x5.000	636	2800	....	....	....	180.69	6.57	22622	....	....	12.79	12.37	10.82
Bearcat III ST-220	1246	Die.	29380	None	6	5.500x6.000	855	2100	....	....	....	175.58	4.84	26936	....	....	13.24	12.60	11.04
Bearcat III ST-225(1)	1414	Die.	30005	465	6	4.75x6.00	638	2100	....	....	....	197.69	5.47	28805	....	....	13.99	13.54	11.65
Bearcat III PT225	1272	Die.	30825	None	6	4.75x6.00	638	2200	(3)	....	....	180.86	6.33	29749	....	....	12.02	10.80	9.29
Bearcat IV KM-225	1542	Die	33820	5420	6	4.921x5.354	611	2100	....	....	....	203.31	4.82	31556	....	....	16.43	15.28	13.12
Cougar II	1170	Die.	27995	1305	6	4.75x6.00	638	2200	....	....	....	228.15	4.44	26432	....	....	13.15	12.77	11.59
Cougar III ST-250	1239	Die.	29800	None	6	4.75x6.00	638	2200	....	....	....	210.35	6.38	26612	....	....	12.74	11.90	10.36
Cougar III ST-250(2)	1452	Die.	29965	None	6	4.75x6.00	638	2100	....	....	....	215.98	6.11	29539	....	....	15.16	14.40	12.76
Cougar III ST-251	1233	Die.	30840	None	6	5.500x6.000	855	2100	....	....	....	205.82	7.98	26880	....	....	14.74	13.69	11.60
Cougar III PT270	1273	Die.	32210	1495	6	4.75x6.00	638	2200	(3)	....	....	219.39	6.29	30122	....	....	12.73	11.81	10.23
Cougar III ST-270	1238	Die.	29930	None	6	4.75x6.00	638	2200	....	....	....	228.96	6.38	25371	....	....	13.32	12.62	10.96

(1) 5279 with front drive engaged. (2) 6194 with front drive engaged. (3) 7253 with front drive engaged. (4) 13707 with front drive engaged.

Cougar III PTA 280	1402	Die.	33675	2895	6	5.50x6.00	855	2100	....	....	....	224.92	5.54	32625	....	....	13.74	12.54	10.44
Cougar III PTA-280	1413	Die.	33150	2370	6	5.40x6.50	893	2100	....	....	....	236.55	7.07	32085	....	....	14.24	13.14	11.19
Cougar III ST-280	1401	Die.	33105	2625	6	5.50x6.00	855	2100	....	....	....	236.82	5.37	31517	....	....	14.55	13.20	11.05
Cougar III ST-280	1412	Die.	33345	2705	6	5.40x6.50	893	2100	....	....	....	246.13	6.28	32099	....	....	14.85	13.76	11.69
Panther III ST-310	1235	Die.	30850	None	6	5.50x6.00	855	2100	....	....	....	261.78	7.90	26757	....	....	13.95	13.09	11.02
Panther III ST-325	1236	Die.	31080	None	6	5.40x6.50	893	2100	....	....	....	281.94	7.93	28189	....	....	14.82	14.19	12.64
Panther III PTA-325	1355	Die.	33960	3140	6	5.40x6.50	893	2100	....	....	....	274.88	5.34	31876	....	....	14.28	13.45	11.55
Panther III PT350	1274	Die.	34000	2855	8	5.4x4.75	903	2600	(3)	....	....	305.48	6.51	32276	....	....	14.91	13.75	11.32
Panther IV KM-325	1543	Die.	33715	3955	6	5.50x6.00	855	2100	....	....	....	299.30	6.09	32700	....	....	16.04	14.79	13.00
Panther IV CM-360	1544	Die.	33740	3815	6	5.40x6.50	893	2100	....	....	....	334.37	6.03	32328	....	....	15.96	15.15	13.29
Panther IV SM-325	1550	Die.	33930	5030	6	4.921x5.906	674	2100	....	....	....	278.09	6.78	33651	....	....	17.12	15.98	14.22
Panther CP-1325 12 Sp.	1453	Die.	35870	410	6	5.40x6.50	893	2100	299.10	1002	299.10	266.97	6.95	33802	16.56	13.59	14.71	13.86	11.95
Panther CP-1360 12 Sp.	1455	Die.	39120	3860	6	5.40x6.50	893	2100	334.33	1002	334.33	294.07	6.89	36123	16.75	13.78	14.60	13.81	11.85
Panther CP-1400 12 Sp.	1464	Die.	43615	7165	6	5.40x6.50	893	2100	....	....	....	334.94	8.17	40272	....	....	14.92	14.12	12.07
Panther KP-1325 12 Sp.	1465	Die.	35815	605	6	5.50x6.00	855	2100	301.21	1002	301.21	267.87	6.93	34267	17.38	13.97	15.58	14.15	11.84
Panther KP-1360 12 Sp.	1456	Die.	39570	4090	6	5.50x6.00	855	2100	326.12	1002	326.12	291.14	6.92	36771	17.39	14.15	15.45	14.27	12.15
Panther KP-1400 12 Sp.	1463	Die.	43175	6640	6	5.50x6.00	855	2100	....	....	....	333.18	4.82	40803	....	....	15.87	14.54	12.10
Tiger II	1169	Die.	29930	2330	8	5.500x4.750	903	2600	....	....	....	270.21	6.73	28097	....	....	13.88	12.70	10.61
Tiger III ST450	1282	Die.	47370	4645	6	6.25x6.25	1150	2100	....	....	....	372.61	6.56	42610	....	....	14.18	12.70	10.56

(1) SN. 109-00328 and higher. (2) SN. 104-00331 and higher. (3) Equipped with hydrostatic PTO-105HP at 1000 RPM.

Versatile

256 Hydrostatic	1518	Die.	10460	1310	4	4.02x4.72	239	2500	84.36	540	85.08	62.81	5.49	9134	16.45	12.67	11.82	11.07	9.52
555	1331	Die.	25980	6330	8	4.625x4.125	555	2850	182.25	1000	184.35	154.20	4.56	23533	16.33	11.15	12.96	11.17	8.83
835 12	1356	Die.	28000	3720	6	5.50x6.00	855	2100	198.23	1009	198.23	179.07	6.13	26380	15.13	11.36	13.16	11.87	9.70
835 Series 3 12 Speed SN.835-83-036769 & higher	1482	Die.	27980	3595	6	5.50x6.00	855	2100	200.30	1009	200.30	181.14	5.34	25687	15.82	11.86	14.45	12.74	10.45
875	1279	Die.	29500	4980	6	5.50x6.00	855	2100	248.07	1008	248.07	228.35	9.12	24457	15.45	11.76	13.60	12.28	10.40
875	1332	Die.	29480	4160	6	5.50x6.00	855	2100	247.16	1008	247.16	221.66	4.86	26795	16.06	12.02	14.35	12.53	10.34
875 Series 3 12 Speed SN. 875-83-067906 & higher	1483	Die.	29500	3870	6	5.50x6.00	855	2100	252.67	1008	252.67	227.48	5.65	26725	16.82	13.06	15.25	13.73	11.82
895 12 Speed	1335	Die.	32500	7880	6	5.50x6.00	855	2100	....	....	....	261.63	6.45	29402	....	....	15.15	13.72	11.57
1150 8 Speed	1462	Die	46500	11360	6	6.25x6.25	1150	2100	....	....	....	400.29	5.92	43219	....	....	15.64	14.64	12.35

White

2-30 8 Speed	1373	Die.	3853	848	3	3.386x3.386	91.4	2600	28.33	540	24.50	25.81	8.35	2816	12.03	10.27	10.77	11.42	9.61
2-35 8 Speed	1374	Die.	3970	800	3	3.386x4.02	108.4	2400	32.84	540	30.94	30.37	8.00	2978	12.68	10.86	11.23	11.73	10.35
2-45 20 Speed	1395	Die.	6630	660	4	3.858x3.62	169.3	2250	43.73	540	36.62	37.32	3.97	4455	12.70	11.25	10.96	11.00	9.66
2-50 Field Boss	1231	Die.	6880	2325	3	3.940x4.330	158	2500	47.02	540	43.94	41.86	4.80	5640	15.80	13.03	13.26	13.49	11.97
2-55 16 Speed	1466	Die.	7055	860	4	4.02x3.94	199.4	2200	53.32	540	45.74	48.49	4.88	5037(1)	14.89	12.38	13.35	13.21	11.39
2-60 Field Boss	1232	Die.	8990	3830	4	3.940x4.330	211	2400	63.22	540	54.35	54.78	5.07	7352	17.63	13.82	14.40	13.87	11.93
2-62 20 Speed	1396	Die.	6875	635	4	4.016x4.33	219	2200	61.46	540	54.25	51.63	6.05	4695	16.31	13.85	13.76	13.49	12.08
2-65 16 Speed	1467	Die.	7110	790	4	4.02x4.65	235	2200	62.50	540	55.40	56.67	6.51	4827(2)	16.19	12.91	13.94	13.20	11.29
2-70	1212	Die.	9630	1000	6	3.875x4.000	283	2200	70.71	994	70.71	59.47	6.40	7550	14.56	12.28	11.92	12.13	10.72
2-75 16 Speed	1486	Die.	9625	1705	6	4.016x4.33	329	2200	75.39	1007	75.64	65.05	6.04	6487(3)	15.86	12.02	13.01	12.21	10.48
2-85	1213	Die.	12280	580	6	3.875x5.00	354	2200	85.54	1007	85.54	71.93	8.13	9309	14.62	11.72	12.24	11.64	9.71
2-88 18 Speed	1487	Die.	13615	None	6	3.875x5.00	354	2200	86.78	1007	86.78	74.67	6.51	9486(4)	15.71	12.69	13.62	12.74	10.79
2-105 Field Boss	1181	Die.	11810	None	6	3.875x5.00	354	2200	105.61	1007	105.61	90.81	6.34	9212	15.76	12.02	12.89	11.95	10.00
2-110 18 Speed	1468	Die.	13955	None	6	3.875x5.00	354	2200	110.52	1000	110.52	94.90	6.40	9500(5)	16.77	13.27	14.19	13.08	10.84
2-135	1275	Die.	16360	2225	6	4.56x4.87	478	2200	137.64	1000	138.03	117.67	8.93	11907	14.91	11.38	12.31	11.42	9.73
2-150 Field Boss	1182	Die.	16940	None	6	4.750x5.500	585	2200	147.49	1007	147.49	127.49	5.63	15059	14.46	11.90	12.07	12.14	10.63
4-150 Field Boss	1159	Die.	16960	None	8	4.50x5.00	636	2800	151.87	1000	152.45	133.34	6.34	16925	15.09	11.45	12.46	11.34	9.21
2-155	1276	Die.	16650	None	6	4.56x4.87	478	2200	157.73	1000	162.37	139.68	9.04	14512	15.38	11.91	12.69	11.53	9.97
4-175 Field Boss	1375	Die.	20420	None	8	4.50x5.00	636	2600	151.69	1000	151.29	133.72	6.39	19905	15.50	11.70	12.96	11.98	10.01
2-180	1287	Die.	18280	None	8	4.50x5.00	636	2800	181.89	1000	181.89	163.64	6.50	15499	14.38	11.66	12.85	12.48	10.56
4-180 Field Boss	1184	Die.	20600	None	8	4.50x5.00	636	2800	181.07	1000	182.30	156.54	4.59	20469	14.19	11.47	11.79	11.56	9.98
4-210 Field Boss	1318	Die.	23735	None	8	4.50x5.00	636	2800	182.44	1000	182.44	162.25	5.89	22934	14.26	11.53	12.34	12.10	10.25

(1) 6318 with front wheel drive engaged. (2) 6187 with front drive engaged. (3) 8028 with front drive engaged. (4) 12632 with front drive engaged. (5) 12944 with front drive engaged.

Yanmar

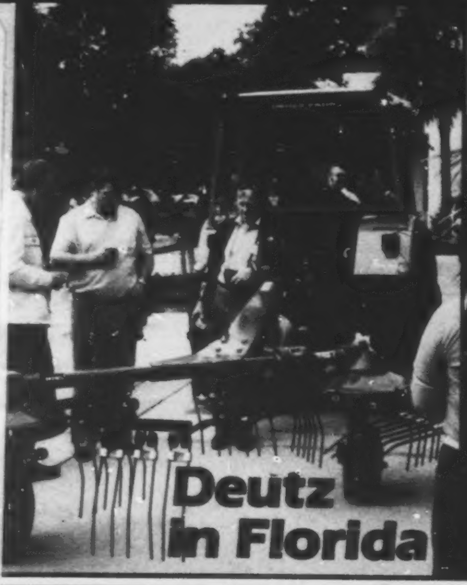
YM240	1199	Die.	3305	1355	2	3.543x3.543	70	2400	19.76	540	18.75	16.60	4.86	2442	15.05	12.64	12.36	11.95	10.37
YM226D	1442	Die.	3390	1080	3	2.95x3.35	68.7	2600	19.42	540	17.87	16.14	4.78	2073	15.07	11.67	11.92	10.93	9.26
YM276D	1443	Die.	4110	1405	3	3.31x3.35	86.2	2600	23.00	540	22.82	18.93	5.78	2412	14.35	11.06	11.08	10.57	8.90
YM336D	1444	Die.	5020	1615	3	3.31x3.54	91.3	2600	26.98	540	25.63	23.00	6.28	3086	14.27	11.32	11.39	10.66	9.64

The business magazine of the farm and industrial equipment industry APRIL 1985

JI Case in Las Vegas

Sperry New Holland in Tuscon

White in Phoenix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April 1985 • Vol. 100 •No. 6

8: Prospering During the Decline. Part two of a three-part series explains the steps needed to understand market needs and reaching customers with the right messages.

12: Where the Horsepower Went in 1984. The annual report of tractor sales by horsepower and state.

The Tribes Gather. With rapid change and uncertainty troubling the farm machinery business, four big national dealer meetings were convened to reassure the clans.

14: Tenneco/Case/IH in Las Vegas.

16: Deutz in Florida.

18: Sperry New Holland in Tucson.

22: White Farm Equipment in Phoenix.

32: Four Combine Lines Get Upgrades, Changes. Deere, Massey-Ferguson, Sperry New Holland, and Allis-Chalmers announce their 1985 combines.

36: Using Nebraska Tests to Select a Tractor. Last of the five-part series takes you through the process of using the tests to choose a good machine for specific needs.

38: Cycles on the Farm: New Market for Ag Dealers? Three- and four-wheel motorcycles seem to be catching on as farm machines. Should a dealer consider them as a sideline? First of a two-part series.

On the cover...the tribes gather in the sunshine of Florida, Nevada and Arizona.

DEPARTMENTS

I&T Update....................4
Editor's Notebook.............6
Industry in Motion...........24
New Literature...............25
Retail Sales of Selected Farm Equipment...26
What's New...................28
Farm Equipment Patents.......33
Auction Prices...............34
Brown Pages..................46
Classified Ads...............50
Index to Advertisers.........50

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I&T Update

Retail Sales Soft in All Product Groups in February

The flash report of the Farm & Industrial Equipment Institute indicated U.S. retail unit sales volume was down in every product category for February and for the year to date:

	Unit Retail Sales					
	February			January-February		
	1985	1984	Pct. Change	1985	1984	Pct. Change
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	2,200	2,668	−17.5	4,611	4,808	− 4.1
40-99 hp	1,706	2,710	−37.0	4,445	5,792	−23.3
100-139 hp	346	590	−41.4	1,234	1,326	− 6.9
Over 140 hp	561	1,012	−44.6	1,689	2,234	−24.4
Total 2-wheel drive	**4,813**	**6,980**	**−31.0**	**11,979**	**14,160**	**−15.4**
4-wheel drive						
Under 200 hp	36	131	−72.5	131	272	−51.8
Over 200 hp	81	226	−64.2	223	412	−45.9
Total 4-wheel drive	**117**	**357**	**−67.2**	**354**	**684**	**−48.2**
Total All Tractors	**4,930**	**7,337**	**−32.8**	**12,333**	**14,844**	**−16.9**
S-P Combines	173	618	−72.0	915	1,706	−46.4
Balers (under 200-lb. bales)	133	318	−58.2	439	596	−26.3
Forage Harvesters (shear-bar type)	56	109	−48.6	170	227	−25.1
Mower-Conditioners	196	542	−63.8	676	992	−31.9

BWAC Calls WFE Loans

The following telegram was received at press time:

Oakbrook, Ill., March 26, 1985: White Farm Equipment Co. announced today that its largest creditor, Borg Warner Acceptance Corp. (BWAC), has demanded repayment on its loans.

The company said it intends to continue operations while an appropriate business plan is developed with BWAC. Options which will be pursued include the sale of certain facilities or product lines; merger or joint venture with another manufacturer; continued operation as a subsidiary of BWAC, or sale of the entire business as an ongoing company.

Complete marketing support, including parts, warranty and service, will continue to be provided to the approximately 900 White Farm North American dealers while future plans are developed.

Deutz Prepares Allis-Chalmers Buyout

Milwaukee, March 28: Allis-Chalmers Corp. announced today a preliminary agreement to sell A-C's ag division, including the A-C Credit Corp., to Klockner-Humboldt-Deutz AG of West Germany.

The transaction is valued at $100 million, and involves businesses carried on the A-C books at an investment value of $260 million. Allis-Chalmers could participate in future profits of the new business.

The purchase requires approval by the KHD supervisory board, the A-C board when it meets in May, the U.S. government and firms to whom A-C owes money.

Bartlett Named President of Deere

Boyd C. Bartlett has been elected president and chief operating officer of Deere & Co. He had been executive vice-president of operations since 1983. Robert Hanson, who had held the titles of both chairman and president, continues as chairman and chief executive officer.

Bartlett joined Deere in 1952. His assignments have included director of marketing services, director of sales branches, vice-president of farm equipment and consumer products marketing, and senior vice-president of that division. He has been on the board of directors since 1979.

Detroit Diesel, Deere Study Joint Venture

Detroit Diesel Allison Div. of General Motors and Deere & Co. have signed a letter of intent under which the two organizations will study the feasibility of forming a joint venture in the diesel engine business.

DDA and Deere intend to implement a distribution agreement "as soon as possible" which would permit each company to distribute selected diesel engine products made by the other.

Hesston Posts Loss Of $4.5 Million

Hesston Corp. has announced a loss of $4.48 million for 1984 on sales of $191 million, compared with earnings of $2 million on sales of $198 million in 1983.

Fourth quarter losses were $2.7 million on sales of $45.5 million, compared with a loss in the same 1983 period of $2.7 million on sales of $42 million.

Howard Brenneman, president, indicated that heavy discounting in tractor markets as well as high sales financing costs were principal contribtors to the loss. The Woods Div. of Hesston, the company said, continues to be profitable.

Briefly...

NFPEDA has announced the dates and locations of its annual conventions for the next four years: **1985**—Sept. 8-12, Louisville; **1986**—Aug. 24-28, Reno; **1987**—Aug. 16-20, Memphis; and **1988**—Aug. 7-11, Vancouver. The 1985 and 1987 conventions are set to coincide with the Agri-Tech International, a trade-only farm equipment exhibition set for the Kentucky Fair & Exposition Center, Sept. 11-14, 1985, and with the Agricenter International in Memphis, Aug. 19-22, 1987.

Deere's 1st Period: Loss of $28 Million

Deere & Co. had a net loss of $28.2 million in the first quarter of fiscal 1985 (ended Jan. 31), compared with earnings of $2 million in the same 1984 period. Sales were $763 million, up 14 per cent from the previous year's opening quarter.

Robert A. Hanson, chairman, said net sales by Deere to its dealers were down 14 per cent and production was down 15 per cent in the first quarter. North American farm equipment production tonnage was down 27 per cent.

Income of retail finance and leasing subsidiaries was up in the quarter from $12 million to $20.8 million. Insurance income rose from $5.8 million to $6.6 million.

An increase in dealers' retail sales reduced trade receivables by $142 million to $2.705 billion, compared with $2.715 billion a year earlier.

Farm equipment sales were off 20 per cent to $576 million; industrial volume rose 12 per cent to $187 million. North American volume was down 18 per cent to $589 million; overseas sales went up 2 per cent to $174 million.

1984 Retail Sales of Farm Whe

	Two-Wheel Drive Tractors										
State	Under 20	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100-119	12 12
Alabama	586	499	266	452	229	124	135	99	5	51	60
Alaska	39	28	1	2	.....	.....	1	.....	.....	.....	.....
Arizona	157	96	50	47	28	32	42	75	11	41	37
Arkansas	917	551	205	427	276	289	110	78	4	31	24
California	1,305	1,143	343	381	498	528	677	359	30	160	62
Colorado	324	231	76	58	70	55	37	42	6	46	47
Connecticut	262	135	58	53	39	38	7	12	1	5	4
Delaware	77	40	11	14	19	12	21	12	1	9	8
Florida	1,405	781	501	432	225	319	398	289	4	78	61
Georgia	894	817	489	590	362	329	279	201	3	81	125
Hawaii	25	28	17	17	12	7	8	1	.....	.....	.....
Idaho	110	68	38	54	46	63	41	46	15	84	87
Illinois	737	360	90	180	139	245	170	192	9	163	160
Indiana	723	399	120	164	110	166	68	127	10	100	86
Iowa	305	126	38	59	117	145	134	143	23	236	266
Kansas	355	201	49	91	55	71	73	94	18	167	127
Kentucky	471	343	231	642	469	298	164	163	14	53	22
Louisiana	1,193	941	291	357	155	218	140	50	4	30	35
Maine	277	135	44	40	40	20	9	21	1	14	5
Maryland	734	343	89	85	111	65	47	59	6	40	43
Massachusetts	261	162	53	45	41	19	18	9	.....	5	2
Michigan	798	410	80	163	174	211	158	153	18	137	74
Minnesota	286	148	47	69	61	155	137	214	34	245	181
Mississippi	500	538	242	372	180	230	158	99	4	37	51
Missouri	724	340	124	287	218	246	185	194	26	108	87
Montana	96	70	46	54	21	60	29	66	10	69	47
Nebraska	107	65	35	21	19	39	34	86	10	154	162
Nevada	21	20	.....	2	10	6	1	4	1	8	.....
New Hampshire	284	201	62	52	51	17	15	20	1	6	2
New Jersey	403	288	77	108	68	20	19	11	7	24	5
New Mexico	54	58	44	38	16	22	13	24	5	10	15
New York	955	610	196	197	226	230	152	293	31	153	77
North Carolina	1,092	708	552	784	354	309	169	200	10	85	59
North Dakota	71	67	11	11	18	19	18	46	11	75	138
Ohio	1,331	531	149	233	267	269	186	201	15	146	87
Oklahoma	516	351	116	207	111	114	75	96	6	104	123
Oregon	652	234	67	167	146	87	52	76	19	45	34
Pennsylvania	1,457	599	162	250	271	308	153	205	21	131	49
Rhode Island	42	29	7	1	4	2	.....	.....	.....	.....	.....
South Carolina	481	378	278	261	103	101	63	69	2	24	19
South Dakota	63	18	4	12	19	31	22	102	16	140	134
Tennessee	879	629	342	737	402	351	122	92	9	48	32
Texas	2,692	2,155	876	1,449	759	989	511	458	45	273	258
Utah	138	117	22	50	52	83	41	46	6	48	21
Vermont	162	77	27	22	47	61	28	45	5	8	5
Virginia	840	441	186	378	244	205	105	151	16	51	27
Washington	519	305	104	296	279	111	119	49	4	28	16
West Virginia	156	66	57	79	64	54	25	16	.....	4	1
Wisconsin	257	167	67	81	143	325	265	449	64	282	243
Wyoming	37	22	12	19	17	22	15	37	9	24	31
U.S. Government	.....	.....	.....	.....	.....	529	.....	.....	.....	1	.....
Miscellaneous	22	84	13	57	86	34	237	21	.....	5	10
TOTAL	**26,792**	**17,153**	**7,065**	**10,647**	**7,472**	**8,283**	**5,686**	**5,595**	**570**	**3,867**	**3,249**

DATA: Farm & Industrial Equipment Institute. Figures do not include garden tractors, motor tillers, or contractor's off-highway types. Report includes units marketed by these firms: Allis-Chalmers, J I Case, Deere, Deutz, Ford, Hesston, International Harvester, Kubota, Long, M-R-S-, Massey-Ferguson, SAME, Steiger, Versatile, White, and Yanmar. Sales reported as miscellaneous are retail sales which cannot be classified by state or as U.S. Government. They include sales and dispositions that do not go through usual marketing channels such as gifts to non-profit organizations, intra-plant or company transfers, etc.

Tractors by PTO Horsepower (in units)

130-139	140-159	160-179	180 & Over	Total 2-Wheel Drive	Four-Wheel Drive Tractors: Under 200	200-249	250 & Over	Total 4-Wheel Drive	Total All Farm Wheel Tractors	State
34	62	35	16	2,653	6	1	3	10	2,663	Alabama
......	......	......	......	71	......	......	......	......	71	Alaska
26	44	43	53	782	2	10	18	30	812	Arizona
59	76	264	403	3,714	16	42	33	91	3,805	Arkansas
123	96	144	97	5,946	46	57	83	186	6,132	California
14	89	68	71	1,234	33	34	39	106	1,340	Colorado
1	3	......	......	618	3	......	......	3	621	Connecticut
5	7	12	......	248	4	1	2	7	255	Delaware
8	76	24	13	4,614	8	6	5	19	4,633	Florida
59	262	99	65	4,655	1	1	8	10	4,665	Georgia
......	......	1	......	116	2	......	3	5	121	Hawaii
79	89	131	111	1,062	46	32	39	117	1,179	Idaho
220	489	547	257	3,958	151	79	82	312	4,270	Illinois
120	249	243	116	2,801	62	42	31	135	2,936	Indiana
218	603	376	175	2,964	64	27	38	129	3,093	Iowa
109	313	281	195	2,199	122	128	92	342	2,541	Kansas
16	28	13	18	2,945	3	5	7	15	2,960	Kentucky
26	51	126	277	3,894	20	14	14	48	3,942	Louisiana
4	3	......	2	615	......	......	......	......	615	Maine
17	19	13	12	1,683	2	5	......	7	1,690	Maryland
1	4	1	......	621	......	......	......	......	621	Massachusetts
101	151	97	26	2,751	84	33	15	132	2,883	Michigan
165	425	215	59	2,441	114	104	77	295	2,736	Minnesota
40	84	225	270	3,030	5	5	15	25	3,055	Mississippi
99	136	141	121	3,036	23	32	20	75	3,111	Missouri
31	41	29	8	677	62	76	57	195	872	Montana
111	324	264	167	1,598	45	34	20	99	1,697	Nebraska
6	......	1	2	82	2	4	......	6	88	Nevada
1	......	......	......	712	1	......	......	1	713	New Hampshire
3	4	3	-1	1,039	1	......	......	1	1,040	New Jersey
8	18	23	23	371	5	4	10	19	390	New Mexico
58	74	26	18	3,296	21	15	9	45	3,341	New York
43	92	54	60	4,571	3	2	7	12	4,583	North Carolina
96	277	188	66	1,112	192	138	127	457	1,569	North Dakota
107	184	122	59	3,887	52	32	24	108	3,995	Ohio
41	302	134	68	2,364	83	79	51	213	2,577	Oklahoma
30	56	25	15	1,705	13	14	14	41	1,746	Oregon
53	31	15	12	3,717	12	5	4	21	3,738	Pennsylvania
......	......	......	......	85	......	......	......	......	85	Rhode Island
13	48	24	40	1,904	......	2	......	2	1,906	South Carolina
103	204	159	33	1,060	64	59	46	169	1,229	South Dakota
44	80	104	65	3,336	5	4	6	15	3,351	Tennessee
222	577	558	516	12,338	37	76	113	226	12,564	Texas
17	23	14	10	688	6	1	8	15	703	Utah
14	6	......	2	509	4	1	......	5	514	Vermont
21	39	16	16	2,736	4	......	1	5	2,741	Virginia
30	41	32	23	1,956	28	42	35	105	2,061	Washington
......	3	......	......	525	1	......	......	1	526	West Virginia
122	218	99	39	2,821	52	12	18	82	2,903	Wisconsin
10	24	17	6	302	19	4	3	26	328	Wyoming
......	......	......	......	530	......	......	......	......	530	U.S. Government
......	9	9	3	590	......	......	3	3	593	Miscellaneous
2,727	**6,031**	**5,015**	**3,607**	**113,759**	**1,533**	**1,262**	**1,180**	**3,975**	**117,734**	**TOTAL**

RETAIL SALES OF SELECTED FARM EQUIPMENT — Jan.-Dec., 1983 and 1984(1)

(In Units)

	Combines Self-Propelled		Corn Heads		Hay Balers(2)		Windrowers Self-Propelled				Grinder-Mixers		Shear-Bar Forage Harvesters(3)		Mower Conditioners All Types	
							Power Units		Total Heads							
State	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984
Alabama	110	89	16	23	112	101	.....	.....	.....	.....	67	41	12	12	84	91
Alaska	.....	.....	.....	.....	4	3	.....	.....	.....	.....	.....	.....	2	1	5	3
Arizona	9	45	1	1	17	33	34	46	39	56	1	1	4	9	6	4
Arkansas	365	424	3	8	131	165	.....	.....	.....	.....	49	31	10	11	234	250
California	91	78	33	38	110	131	150	159	172	180	2	1	56	37	35	22
Colorado	147	121	43	47	290	258	136	112	149	123	18	12	39	23	114	85
Connecticut	.....	.....	.....	.....	45	37	.....	.....	.....	.....	2	1	27	31	62	60
Delaware	24	33	14	22	8	13	1	.....	1	.....	3	3	2	7	11	11
Florida	29	20	5	5	56	72	.....	.....	.....	-2	8	3	13	16	57	38
Georgia	197	238	82	111	128	133	8	1	8	1	66	44	25	31	134	150
Hawaii	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Idaho	231	183	6	3	288	220	160	136	184	148	18	13	40	27	102	55
Illinois	1,417	1,424	1,342	1,297	217	236	11	4	12	6	281	140	116	103	455	417
Indiana	778	763	719	695	212	192	3	4	5	4	215	119	84	86	409	403
Iowa	1,411	982	1,323	1,115	193	171	39	22	46	23	703	288	187	105	585	517
Kansas	852	697	82	88	199	171	154	115	156	123	88	49	69	43	420	323
Kentucky	128	171	87	95	182	205	6	2	5	2	127	80	69	77	717	593
Louisiana	144	156	2	4	68	76	.....	.....	1	.....	11	6	2	2	21	28
Maine	3	1	.....	.....	48	53	1	2	1	2	1	.....	22	20	70	86
Maryland	71	96	61	82	88	75	5	5	5	6	21	19	26	36	129	104
Massachusetts	.....	.....	1	.....	48	37	.....	.....	.....	.....	.....	.....	32	24	57	58
Michigan	260	212	234	213	236	248	23	25	26	28	140	110	181	198	428	465
Minnesota	1,008	755	659	489	574	413	245	162	257	178	319	155	386	300	865	653
Mississippi	215	206	6	5	57	66	3	1	3	1	33	18	23	24	41	50
Missouri	435	444	128	141	278	298	14	22	15	16	188	118	91	44	799	879
Montana	350	191	.....	.....	123	105	179	105	213	121	38	32	17	30	111	102
Nebraska	771	531	540	405	123	71	131	109	152	130	213	84	141	84	375	235
Nevada	1	1	.....	.....	23	28	33	26	38	30	3	2	6	2	7	8
New Hampshire	.....	.....	.....	.....	45	42	.....	.....	-1	.....	.....	.....	25	20	41	57
New Jersey	8	11	2	4	39	29	.....	1	.....	1	5	9	7	6	50	50
New Mexico	3	11	.....	1	101	151	46	38	50	40	5	2	9	3	24	24
New York	49	49	58	55	460	432	38	25	40	25	67	31	419	390	787	741
North Carolina	222	247	194	218	202	221	1	1	1	1	72	43	47	50	339	351
North Dakota	682	652	49	44	34	18	319	252	368	283	82	59	67	49	161	112
Ohio	481	466	356	391	359	340	9	11	10	11	167	145	130	131	618	613
Oklahoma	257	269	6	2	263	275	74	53	83	56	61	29	16	9	520	350
Oregon	130	77	2	8	215	167	93	65	114	74	17	2	21	28	135	78
Pennsylvania	94	112	97	107	595	539	25	31	28	31	156	132	272	266	817	842
Rhode Island	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	1	.....	2	3
South Carolina	95	98	43	42	46	64	.....	.....	.....	.....	23	17	9	17	87	102
South Dakota	385	294	160	117	75	56	232	201	244	225	173	92	136	123	123	113
Tennessee	175	219	40	38	249	237	1	2	1	2	125	88	54	48	603	558
Texas	448	497	83	123	611	519	50	45	64	46	132	105	27	24	1,012	844
Utah	26	24	4	2	247	206	71	57	73	63	14	7	39	38	147	154
Vermont	1	.....	.....	2	74	55	.....	4	.....	4	.....	1	87	61	172	165
Virginia	84	92	60	68	195	167	2	2	2	2	63	47	82	105	506	545
Washington	238	157	19	16	248	210	72	53	79	64	9	1	52	28	115	110
West Virginia	3	2	5	3	79	84	.....	.....	.....	.....	9	15	24	12	128	121
Wisconsin	204	259	252	283	911	787	135	133	144	132	204	150	870	737	1,485	1,400
Wyoming	46	25	13	8	131	102	89	59	99	71	19	4	15	10	56	34
U.S. Government	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Miscellaneous(4)	73	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
TOTAL	**12,751**	**11,422**	**6,830**	**6,419**	**9,037**	**8,314**	**2,593**	**2,091**	**2,887**	**2,307**	**4,018**	**2,349**	**4,091**	**3,538**	**14,261**	**13,057**

Data released Feb. 12, 1985, Farm & Industrial Equipment Institute.

(1) Includes revisions for prior months.

(2) For making bales of under 200 lbs.

(3) Pull-type, mounted, self-propelled.

(4) Sales reported as miscellaneous are retail sales which cannot be classified by state or as U.S. Government. They include sales and dispositions that do not go through usual marketing channels such as gifts to non-profit organizations, intra-plant or company transfers, etc.

I&T
SINCE 1886

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

JONES FARM EQUIPMENT CO.
Dothan, Alabama
February 12, 1985

ALLIS-CHALMERS TRACTORS

7060 diesel, 1972 (Fair)	3650*
7030 diesel, cab, 1974 (Good)	7500
XT190 diesel, 1968 (Fair)	3000*

CASE TRACTORS

2090 diesel, cab, 1981 (Excellent)	1400
1370 diesel, cab, 1976 (Good)	7500*
1070 diesel, 1970 (Fair)	2800

DEUTZ TRACTOR

8006 diesel, 1975 (Fair)	1750

MASSEY-FERGUSON TRACTORS

2805 diesel, cab, 1977 (Good)	8000*
2775 diesel, cab, 1978 (Good)	10,500*
1135 diesel, 1974 (Good)	4700*
1130 diesel, duals, 1968 (Rough)	2400
1105 diesel, 1977 (Excellent)	5500
1030 diesel, (Fair)	4050
285 diesel, 1977 (Good)	5200
275 diesel, 1975 (Good)	5200
265 diesel, 1977 (Good)	5750
255 diesel, 1980 (Good)	4250*
245 diesel, 1980 (Good)	4500
245 diesel, 1977 (Good)	4500
245 diesel, 1976 (Fair)	3575
240, 1984 (Excellent)	7800*
235 diesel, 1975 (Rough)	2750*
178 diesel, (Rough)	2350*
180 diesel, 1966 (Fair)	2850
180 diesel, 1966 (Rough)	2300
175 diesel, 1974 (Excellent)	4100*
175 diesel, 1970 (Fair)	2600*
175 diesel, 1969 (Good)	3250*
175 diesel, 1965 (Rough)	2250
165 diesel, 1973 (Fair)	3250
165 diesel, 1967 (Fair)	2600
135 diesel, 1974 (Good)	3200
135 diesel, 1974 (Good)	3150*
135, 1974 (Rough)	2300*
135, 1974 (Good)	3300*
135, 1972 (Fair)	2550*
135, 1970 (Fair)	2500*
65 diesel, 1963 (Good)	2200
65, 1963 (Good)	2000*
36 diesel, 1963 (Excellent)	2700*
35 diesel, 1962 (Good)	2200*
35, 1962 (Excellent)	2600*
35, 1957 (Good)	1900*
35, 1957 (Good)	1800*
35, 1957 (Good)	1900*
35, 1955 (Fair)	1600*
TO30, burned, 1953 (Rough)	385

FORD-FERGUSON TRACTORS

9N, 1947 (Good)	1250
9N, 1946 (Good)	1050*
9N, 1946 (Good)	900
9N, 1946 (Good)	975

FORD TRACTORS

9600 diesel, duals, 1976 (Good)	6150
9000 diesel, duals, 1972 (Fair)	3550*
8700 diesel, 1977 (Good)	6500*
7700 diesel, cab, 1979 (Excellent)	11,100
6700 diesel, cab, 1978 (Excellent)	9500*
6700 diesel, 1976 (Fair)	4750*
6600 diesel, 1976 (Good)	5500*
5000 diesel, 1969 (Good)	4200*
4600 diesel, 1976 (Fair)	3750*
4000 diesel, 1970 (Good)	3500
4000 diesel, 1970 (Good)	3500
4000 diesel, cab, 1969 (Good)	3250
4000 diesel, 1968 (Rough)	2250
4000 diesel, 1966 (Rough)	1600
3600 diesel, 1975 (Good)	4500*
3600 diesel, 1968 (Good)	3550
3000 diesel, 1977 (Rough)	2050*
3000, 1975 (Excellent)	4200*
3000 diesel, 1970 (Good)	3400*
3000 diesel, 1970 (Good)	3400*
3000 diesel, 1968 (Good)	3200*
3000 diesel, 1968 (Fair)	2900*
3000, 1972 (Rough)	2100
3000 diesel, 1966 (Fair)	2550
2000, 1969 (Good)	2600*
2000, 1966 (Good)	2400*
850, 1956 (Good)	2050
841 diesel, 1958 (Rough)	1125
641, 1961 (Good)	1600*
641, 1961 (Good)	1900
640, 1957 (Good)	1950
640, 1956 (Fair)	1300*
640, 1956 (Good)	1800*
640, 1956 (Rough)	700
Maj., diesel, 1954 (Good)	775
Sup. Dex., 1962 (Good)	1800
Dex. 1959 (Fair)	1150
Jub. 1953 (Good)	1500
8N, 1952 (Excellent)	1500
8N, Idr., 1952 (Good)	1200
8N, 1952 (Excellent)	1525
8N, 1951 (Excellent)	1475
8N, 1951 (Good)	1350*
8N, 1950 (Excellent)	1500*
8N, 1949 (Excellent)	1675
8N, 1948 (Good)	1300
8N, 1948 (Good)	1200*
8N, 1948 (Good)	1300*
8N, 1948 (Fair)	800
8N, 1948 (Excellent)	1550

INTERNATIONAL HARVESTER TRACTORS

1206 diesel, 1967 (Rough)	2250
674 diesel, cab, 1978 (Fair)	3000*
674 diesel, 1976 (Good)	4050
674 diesel, 1976 (Fair)	3100*
656 diesel, 1967 (Good)	3550*
656 diesel, 1965 (Rough)	1300
574 diesel, 1973 (Rough)	2100*
544 diesel, 1969 (Fair)	2000
454 diesel, 1971 (Fair)	2750
454 diesel, 1971 (Fair)	2300*
424 diesel, 1967 (Good)	1850
B414 diesel, 1962 (Rough)	850*
B414 diesel, 1962 (Excellent)	1700*
350, 1957 (Rough)	675
140, cult., 1962 (Good)	1900*
W4, 1944 (Fair)	425
Cub, 1948 (Good)	900*
Cub, mo., 1948 (Good)	1125

JOHN DEERE TRACTORS

4840 diesel, cab, duals, 1981 (Excellent)	29,500*
4640 diesel, cab, duals, 1979 (Good)	16,000*
4620 diesal, duals, 1971 (Good)	7000*
4440 diesel, cab, 1978 (Excellent)	17,500*
4440 diesel, 1978 (Excellent)	17,500*
4230 diesel, cab, 1976 (Good)	9000
3130 diesel, (Fair)	2600
3020 diesel, 1968 (Rough)	3150
3020 diesel, 1967 (Good)	3850
3010, 1961 (Fair)	1825
2840 diesel, 1978 (Excellent)	7100*
2840 diesel, 1978 (Rough)	3350*
2840 diesel, 1978 (Good)	5400
2130 diesel, (Good)	4200
2130 diesel, (Fair)	2700
1520 diesel, 1968 (Good)	2800
1020 diesel, 1971 (Rough)	1300*
1010 diesel, 1962 (Fair)	900*
430, 1961 (Good)	900

KUBOTA TRACTOR

L260 diesel, (Rough)	450

OLIVER TRACTORS

1950T diesel, 1968 (Good)	3900
550 diesel, 1960 (Good)	1800*

WHITE TRACTORS

2-150 diesel, cab, 1976 (Good)	8000*
2-70 diesel, 1976 (Good)	4100*

YODER & FREY INC.
Archbold, Ohio
February 11, 1985

JOHN DEERE TRACTORS

50, duals, 1954 (Rough)	900
60, 1955 (Rough)	850
520, 1957 (Good)	2100*
720, 1956 (Fair)	1600
730, 1958 (Fair)	2600*
730 diesel, 1959 (Good)	2650*
2010, 1962 (Rough)	1300
2010, 1962 (Rough)	1400
2010, Idr., 1962 (Rough)	2150*
2010, 1962 (Fair)	2200
2020, 1967 (Rough)	2800*
3010, 1962 (Fair)	3300*
3020, 1968 (Good)	5400*
3020, 1965 (Good)	4100
3020, 1966 (Good)	3550*
4010, 1963 (Fair)	3900
4010, (Rough)	1800*
4010, 1962 (Fair)	2800*
4020, 1966 (Fair)	5925
4020, 1965 (Fair)	5400
4020, 1966 (Good)	5500
4020, 1964 (Fair)	5300*
4020, 1964 (Rough)	2750*
4020, 1965 (Rough)	3850*
4020, 1966 (Good)	5450
4020, 1968 (Rough)	4500*
4020, 1965 (Good)	5950
4020, 1966 (Good)	6100*
4020 diesel, cab, 1966 (Good)	6400*
4230, duals, 1975 (Good)	12,000*
4230, 1976 (Fair)	12,450
4230, 1975 (Fair)	9400
4240, 4WD, 1980 (Fair)	13,500*
4240, 1970 (Excellent)	17,000*
4320, 1972 (Good)	7800*
4430, 1974 (Fair)	9400
4430, 1975 (Good)	9000*
4430, 1975 (Good)	12,750*
4440, duals, 1981 (Good)	20,500*
4520, 1972 (Good)	6350

DEUTZ TRACTORS

D4506, (Good)	4500
D5006, (Fair)	3500*

ALLIS-CHALMERS TRACTORS

G, 1953 (Fair)	1000*
WD, bld., (Good)	675
WD-45, 1951 (Good)	1250*
D-17, 1963 (Fair)	950
190XT diesel, 1968 (Good)	3800*
190XT diesel, 1968 (Fair)	3100*
200 diesel, cab, air, 1970 (Fair)	5800*
7000 diesel, cab, air, 1976 (Good)	6750*
7030 diesel, cab, 1975 (Rough)	5100*
7045 air, 1976 (Good)	13,000*
7050 diesel, cab, air, 1977 (Fair)	5800

CASE TRACTORS

400, 1956 (Fair)	575
400, (Rough)	560
430, 1965 (Rough)	2400*
730, 1965 (Rough)	800*
770, 1974 (Rough)	3750*
930, 1966 (Fair)	3000*
930, 1967 (Good)	2500
930, 1967 (Rough)	2700*
930, 1967 (Fair)	1700*
970, 1973 (Rough)	7500*
1070, 1973 (Fair)	4600*
1070, 1972 (Fair)	7600
1270, 1973 (Rough)	3900*
1270, 1971 (Rough)	3850*
1370, 1973 (Fair)	5100*
1370, 1974 (Fair)	6100*
1370, 1973 (Fair)	6900*
1370, 1975 (Fair)	7750*
1370, 1973 (Fair)	5700*
1370, 1974 (Rough)	6600*
2670, (Good)	13,100

OLIVER TRACTORS

77, 1950 (Rough)	575
88 diesel, 1949 (Rough)	700*
550, Idr., 1963 (Rough)	2000*
1450 diesel, Idr., 1967 (Good)	3900*
1650 diesel, 1967 (Fair)	2450*
1750 diesel, 1965 (Fair)	2900*
1755 diesel, 1969 (Good)	5250
1755, 1972 (Good)	4800*
1800, 1963 (Fair)	1700
1850, 1964 (Fair)	2600
1855 diesel, cab, 1973 (Fair)	5600*
1955 diesel, (Good)	5200*

MINNEAPOLIS-MOLINE TRACTORS

Jet Star 3, 1960 (Fair)	1175
Jet Star 5, 1959 (Rough)	1100*
445 diesel, 1960 (Rough)	710
G-1000 Vista, 1968 (Fair)	3300*
G-1400, (Fair)	3950*

FORD TRACTORS

8N, Idr., 1950 (Fair)	1325
9N, (Good)	1360
9N, 1942 (Rough)	1075
2000, 1956 (Fair)	1550*
3600, 1978 (Good)	4600*
4000 diesel, 1971 (Fair)	4250
4000, 1964 (Fair)	1700*
5000, 1974 (Fair)	5100
8000, 1972 (Fair)	3600
9000, 1972 (Fair)	5000*
9600 diesel, 1976 (Fair)	7250*
860, 1955 (Fair)	2580
Jub., 1953 (Rough)	1925
Jub., 1954 (Fair)	1950
3000, 1964 (Fair)	2725

INTERNATIONAL HARVESTER TRACTORS

Sup. A, bld., 1950 (Fair)	1600
Sup. A, mo., 1952 (Good)	1800*
Cub, cult., 1950 (Rough)	800*
C, cult., (Rough)	550
C, 1951 (Fair)	700*

C, 1952 (Fair)	750*
M, 1947 (Fair)	775
M, 1947 (Fair)	775*
Sup. M, 1952 (Fair)	1000*
Sup. M, 1952 (Rough)	800*
230, 1960 (Fair)	1000*
300, 1957 (Fair)	850*
300, 1955 (Good)	800*
340, 1960 (Fair)	800*
460, 1959 (Fair)	900*
460, 1958 (Rough)	1275
460, (Good)	1400
460, 1960 (Fair)	950*
504, 1963 (Rough)	1300*
560, 1961 (Good)	2200*
560, 1959 (Good)	1800
560, 1958 (Rough)	1300*
560, 1960 (Good)	2400
2606, ldr., bld., 1967 (Fair)	4900*
656, 1968 (Fair)	3100*
656, 1967 (Fair)	3000*
656, 1969 (Fair)	4100*
706 diesel, 1963 (Rough)	2500*
706, 1961 (Fair)	2050
706, 1964 (Rough)	1650
706, 1966 (Fair)	2475
706, 1963 (Fair)	2450*
706, 1964 (Fair)	3300*
706 diesel, 1963 (Fair)	3550
706, 1963 (Fair)	2050
756, 1969 (Good)	3500
756,	4200
756,	5600
806 diesel, 1963 (Fair)	3900*
806 diesel, 1965 (Fair)	3400
806 diesel, 1965 (Fair)	4100*
806 diesel, 1965 (Good)	3400
806, 1964 (Fair)	3750
856 diesel, 1968 (Good)	6000*
856 diesel, 1970 (Good)	6200*
856 diesel, cab, 1970 (Fair)	5600*
856, 1969 (Fair)	5750*
856, 1971 (Good)	6100*
966 diesel, 1973 (Fair)	6700
966, 1974 (Rough)	6600*
966, 1974 (Fair)	7300*
966, 1975 (Good)	6250*
986, 1978 (Good)	12,000*
986, 1978 (Good)	11,000*
1026, 1975 (Good)	6500*
1026, 1974 (Good)	8000
1066, 1975 (Fair)	8400
1066, 1974 (Good)	7000*
1066, cab, air, 1972 (Good)	7600
1066, 1973 (Fair)	6400*
1066, 1974 (Fair)	6500*
1086, duals, 1977 (Good)	13,200*
1086, cab, air, 1977 (Fair)	11,000*
1206, 1964 (Fair)	4500*
1206, 1965 (Fair)	4300*
1206, 1964 (Fair)	3975
1256 diesel, 1970 (Fair)	5400*
1256, 1970 (Fair)	5100*
1256, 1968 (Fair)	5500*
1456, 1970 (Good)	5500*
1466, 1976 (Good)	6750*
1466, 1974 (Good)	7000*
1466, 1972 (Fair)	6900*
1466, 1974 (Fair)	5800*
1466, 1975 (Fair)	5450
1486, 1979 (Good)	13,250*
1486, cab, air, 1978 (Fair)	11,500*
1486, cab, air, 1976 (Fair)	12,750*
1566, 1971 (Fair)	6300*
1586, 1978 (Good)	11,000*

MASSEY-HARRIS TRACTOR

44, 1945 (Rough)	525

FERGUSON & MASSEY-FERGUSON TRACTORS

TO-30, 1950 (Rough)	1150*
65, 1959 (Fair)	1625
65, 1962 (Fair)	2575
65 diesel, 1959 (Rough)	1900*
85 diesel, 1959 (Fair)	1285
85, 1962 (Rough)	1200*
165, 1968 (Fair)	3150
165, 1972 (Fair)	3800*
165 diesel, 1972 (Fair)	3750
1080 diesel, (Rough)	3750
1085, ldr., 1977 (Fair)	7300*
1085 diesel, 1977 (Fair)	4900*
1135, 1975 (Good)	7500*
1135 diesel, 1975 (Fair)	6250*
1150 diesel, 1969 (Fair)	4300
Sup. 90 diesel, 1963 (Rough)	2450
Sup. 90 diesel, 1961 (Rough)	1100*

WHITE TRACTOR

2-105, cab, 1977 (Rough)	6000*

NOTES:
Prices reported are for individual sales at wholesale on an "as is," "cash and carry" basis. Prices reported are not averages.

Condition Classifications:

EXCELLENT: Engine in perfect condition, 400 to 600 hours of use. Rubber—80% tread remaining, no breaks or cracks. Paint—original and bright. General appearance: excellent.

GOOD: Engine in good running condition. Rubber—70% tread remaining, no breaks or cracks. Paint—original or a good repaint job. General appearance: good over-all.

FAIR: Engine possibly in need of a minor overhaul. Rubber—60% tread remaining, some cracking evident in sidewalls. Paint—only fair, weathered and some rust apparent. General appearance: worn, some dents, minor parts (gage covers, etc.) missing or broken.

ROUGH: Engine obviously in need of a major overhaul. Rubber—smooth. Paint—scarred, weathered, rusty. General appearance: dents, ruptures, broken parts, loose wires, components (such as lights) broken, missing or inoperative.

ACE

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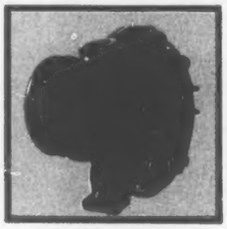
Model FMC-MAG
Counter Clockwise Rotation 1¼" × 1" Straight Centrifugal Pump with Mechanical Seal



FMCH-MAG
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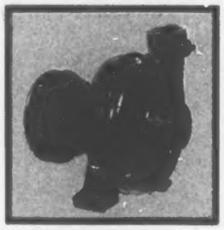
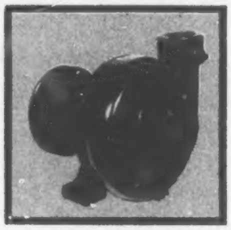


FMC-CW-150-MAG
Clockwise Rotation 1½" × 1¼" Straight Centrifugal Pump with Mechanical Seal



FMC-CW-200-MAG
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Implement &Tractor

The business magazine of the farm and industrial equipment industry MAY 1985

All-Star All-Terrain Attachments page 20

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WHERE PARTS BUYERS GO - AND WHY

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SIMA Shows Its Diversity
page 26

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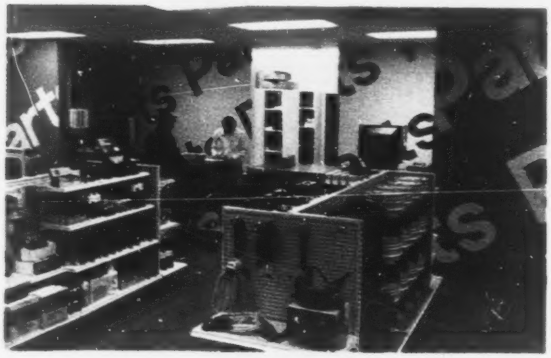

Parts Perspectives

10: **Parts Retailing: Who's Getting the Business?** Study shows dealers carry a high-price image, but they have quality and convenience advantages.

16: **Smart Parts Retailing:** What does the competition do that dealers could do—maybe better?

18: **About That Will-Fit Survey.** An I&T survey finds that three out of four dealers carry will-fit parts.

20: **All-Star All-Terrain Attachments.** With sales of all-terrain vehicles surging, can the attachments be far behind? Last in a two-part series.

26: **SIMA Shows Its Diversity.** The big French farm equipment show bristles with machinery despite tough times.

32: **Marketing to Increase Sales.** Systematic management of knowledge is vital to carrying out a marketing strategy and keeping it flexible. Last in a three-part series.

DEPARTMENTS
I&T Update 6
Editor's Notebook 8
Auction Prices 24
What's New 36
Industry in Motion 50
New Literature 53
Brown Pages 54
Classified Ads 58
Index to
Advertisers 58

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I&T Update

March Sales Show Some Improvement

U.S. retail sales of farm equipment, according to the Farm & Industrial Equipment Institute flash report, showed improvement in some product categories in March over the same month in 1984: two-wheel-drive tractors under 140 hp, forage harvesters and mower-conditioners.

Unit Retail Sales

	March			January-March		
	1985	**1984**	**Pct. Change**	**1985**	**1984**	**Pct. Change**
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	4,325	4,168	+ 3.8	8,908	8,976	− 0.8
40-99 hp	3,775	3,704	+ 1.9	8,225	9,496	− 13.4
100-139 hp	970	952	+ 1.9	2,208	2,278	− 3.1
Over 140 hp	1,036	1,313	− 21.1	2,721	3,547	− 23.3
Total 2-wheel drive	**10,106**	**10,137**	**− 0.3**	**22,062**	**24,297**	**− 9.2**
4-wheel drive						
Under 200 hp	84	164	− 48.8	215	436	− 50.7
Over 200 hp	148	348	− 57.5	368	760	− 51.6
Total 4-wheel drive	**232**	**512**	**− 54.7**	**583**	**1,196**	**− 51.3**
Total All Tractors	**10,338**	**10,649**	**− 2.9**	**22,645**	**25,493**	**− 11.2**
S-P Combines	231	304	− 24.0	1,144	2,010	− 43.1
Balers (under 200-lb. bales)	470	553	− 15.0	909	1,149	− 20.9
Forage Harvesters (shear-bar type)	140	138	+ 1.4	310	365	− 15.1
Mower-Conditioners	976	899	+ 8.6	1,651	1,891	− 12.7

Massey: Profit of $7 Million In Fiscal Year

Massey-Ferguson posted its first 12-month profit since 1979 in the fiscal year ended Jan. 31—$7.2 million on sales of $1.469 billion. A year earlier, the company lost $68 million on sales of $1.535 billion.

For the three months ended Jan. 31, sales were $338 million and losses were $7 million, compared with $362 million in sales and $27 million in losses a year earlier.

For the fiscal year, farm equipment sales were $1.154 billion, down 10.6 per cent; engine sales were up 29 per cent to $314 million. Parts volume (included in the total sales figures) was $230 million (down 7 per cent) for farm equipment and $63 million (up 22 per cent) for engines.

North American sales volume was about identical to that of the previous year, $492 million, though U.S. sales were up 15 per cent to $366 million and Canadian volume down 27 per cent to $125 million.

MF reported that it raised its share of the global tractor market by two percentage points to 17 during the year. Victor Rice, MF chairman, said he expects 1985 demand for farm machinery to remain at about the 1984 level worldwide.

Deutz-Allis Deal: What's Included

The tentative purchase of the farm equipment business of Allis-Chalmers Corp. by Klockner-Humboldt-Deutz of Cologne, West Germany (awaiting approvals by the boards of A-C, K-H-D, government agencies and lenders to A-C as of I&T's late-April deadline) includes the following:

North American sales and service; parts distribution operation; Combine Div.; designs, special product tooling and manufacturing rights for tractors and engines; tractor marketing; lawn and garden operations; implement operations; Allis-Chalmers Credit Corp. and Financial Corp. and its related insurance subsidiaries; and international sales.

The agreement does not include the tractor plant in West Allis, Wis., or the engine plant in Harvey, Ill. Allis-Chalmers will continue production for the new company through the rest of 1985 in West Allis and through mid-1986 at Harvey.

Allis-Chalmers and Deutz are expected to call dealer meetings sometime after mid-May. Allis-Chalmers recently resumed production at its West Allis tractor plant and its Independence (Mo.) combine plant.

Asset Auction Set; White Farm Needs Knight or Miracle

The end of White Farm Equipment, Inc., drew near in late April as Borg-Warner Acceptance Corp. scheduled an auction of the company's U.S. assets and appointed a receiver for White Farm Manufacturing Canada Ltd. There is $214 million due BWAC on loans and interest from the two companies, $148 million from the U.S. business and $66 million from the Canadian.

After a fruitless search for somebody to buy White Farm Equipment, BWAC set up a May 29 auction at the Westin O'Hare Hotel, Rosemont, Ill. Real estate is not included, but all other assets are. Terms of the auction permit BWAC to reject any bids within 48 hours after the auction. Assets will be offered first by separate lots and then in bulk.

"It's set up so a good knight can dash in at the last minute and keep the company intact," said an insider. "In that case, the auction will help set a value on the assets."

The U.S. assets include inventory, receivables, the foundry and tractor factory at Charles City, Ia., the planter and implement works at South Bend, Ind., parts distribution and lift truck operations at Hopkins, Minn., as well as trademarks, contracts, lists and logos.

The assets of White Farm Manufacturing Canada Ltd. (not part of the auction) include inventories, the combine plant at Brantford, Ont., and rotary combine technology. Massey-Ferguson is reportedly interested in acquisition of the technology. A spokesman for Peat Marwick Ltd., the receiver, said the preference is to sell the operation intact.

Robert L. Terry, White Farm Equipment president and a former BWAC executive, describing the BWAC collection moves as "horrible but understandable," said that because so much of the debt is secured by equipment in dealers' lots that BWAC has a good reason to keep its promise to maintain a steady source of parts, service and warranty support.

Of roughly 700 White dealers, Terry said, "almost half have a problem, while the other half have a second line they can continue with. I just hope none of them jump out too quickly. A lot can still happen."

He said that Renault, the state-owned French tractor manufacturer, had earlier shown an interest in White but was apparently not able to develop a proposal.

"We were headed in the right direction," said Terry. "We had a good first quarter, were reducing debt and had momentum. It's really horrible."

A BWAC spokesman said the debt collection came about because "we extended and extended the loans until they far exceeded the value of assets. At a certain point, we had to call a stop to protect our own interests."

PARTS PERSPECTIVES

PARTS RETAILING: Who's getting the business?

Study shows dealers carry a high-price image — but they have quality and convenience advantages.

By Richard A. Edwards

(The author is an agribusiness economist with the Texas Agricultural Extension Service.)

■THE RETAIL side of the farm equipment industry quietly passed a milestone in 1982. It was the first time gross margins from parts sales exceeded gross margins from wholegoods.

Thus: 1982 wholegoods average margin, according to NFPEDA Cost of Doing Business data, was $105,170; for parts it was $142,989. Again in 1983: average margin on wholegoods, $98,311; on parts, $139,805.

Despite the change in emphasis, the industry has been experiencing a growing concern about the loss of sales of universal types of replacement parts. These parts include such items as filters, belts, oil, alternators, batteries, bearings and tillage wear points. There have been alternative sources for such parts for decades — farm supply outlets, mail order, oil distributors, auto parts supply houses and others — but many of these sources have become more aggressive competitors for sales to farmers in recent years.

Many in the farm equipment industry feel that manufacturers and dealers cannot tolerate any further erosion of their parts markets without disastrous consequences, and so part of their interest focuses on customer attitudes.

A survey of Texas farmers, which addressed the issue of where and why they are purchasing interchangeable parts and supplies for tractors and implements, has been recently completed. This article sums up the findings and comments on the issues those findings raise.

The questionnaire, sent to 1400 farmers throughout Texas, was broken into three sections. The first listed a number of interchangeable parts and supplies and asked farmers to indicate where they preferred buying each product. The second asked them to list reasons why they preferred the current supplier. Part three asked for information on price differentials that farmers had experienced when buying from various sources.

Results summary

The parts and supplies listed in section one were, for reporting purposes, broken into three categories: filters, oil-related products, and interchangeable parts.

Based on the responses, dealers do the best in the filters grouping with about 50 to 60 per cent of the volume. Individually, within the grouping, the highest volume was from air and diesel fuel filters with about 60 per cent. About 50 per cent of the oil filters and 35 per cent of the gasoline filters were purchased from dealers.

The major competition was from auto parts houses, which, based on the survey results, are selling about 35 per cent of all filter products. The results suggest that auto supply stores sell more gasoline filters to farmers than do implement dealers. The remaining 15 per cent of sales are from oil distributors and full-line farm supply dealers.

Firms that distribute oil products are the major supplier of oil related products purchased by farmers. The survey reveals that well over 50 per cent of lubricating oils, grease, and engine oil are purchased from oil distributors. In these categories, indications are that implement dealers are supplying farmers less than 20 per cent of these products. The survey reveals that even parts houses sell more engine oil than implement dealers. Implement dealers are the major source for hydraulic and transmission fluids, but just marginally over the oil jobbers.

Among the suppliers of interchangeable parts — belts, batteries, alternators, bearings, plugs and

BUYING PARTS:

THE PLACE OF PURCHASE

THE PRODUCT	Local farm equipment dealer	Local auto-truck parts supply house	Other
Air Filters	58%	29%	14%
Oil Filters	50	33	17
Gasoline Fuel Filters	37	48	16
Diesel Filters	61	25	14
Engine Oil	21	27	52
Hydraulic Fluid	43	20	37
Transmission Fluid	40	23	37
Lubricating Oils	18	28	54
Lubricating Grease	14	28	58
Belts	47	40	13
Batteries	24	45	31
Alternators	34	50	17
Bearings	38	48	15
Spark Plugs	13	71	16
Tires	8	41	50

Source: Texas Agricultural Extension Service tires—auto parts houses rank first in every category but two; belts and tires. Indications are that a slightly higher percentage of belts is bought from implement dealers than auto parts suppliers, and most tires are obtained from tire dealers. This sample of farmers also suggests that implement dealers sell fewer batteries to farmers than do either auto parts firms or other types of suppliers—oil distributors and full-line farm supply firms.

The predominant reasons that farmers are purchasing all the listed products from implement dealers are convenience and quality. Reasons for purchasing from alternative sources come down to price. The perceived price differential in almost all instances was 10 to 20 per cent.

Obviously, implement dealers should be concerned about the competition for sales of allied parts and supplies. The main concern must be the price image. Image is a perceptual concept and whether or not dealer prices are in fact higher than competitors is not the concern. The issue is whether the customer *thinks* dealer prices are higher, and the survey results suggest that such an image does exist.

This image has been built, no doubt, primarily through purchases that customers can recall for comparison purposes. For example, the farmer may buy a battery for his car and when he purchases one for his tractor, its price is 50 per cent higher. Both look similar. Both started the respective vehicles, but the price differential seed has been planted.

While quality, guarantees, battery strength and length of service are major factors that help determine price, they are often overlooked by the consumer. Customers do respond positively to the price-quality relationship and this relationship will help offset a negative price image. But unless consumers are constantly reminded of this relation-

(More...)

CUSTOMERS TELL WHERE AND WHY

THE REASONS WHY FARMERS BUY

FROM DEALERS				FROM PARTS SUPPLY STORES				FROM 'OTHER' OUTLETS			
Lower prices	More convenient	Equal/ better quality	Better selection	Lower prices	More convenient	Equal/ better quality	Better selection	Lower prices	More convenient	Equal/ better quality	Better selection
6%	39%	38%	8%	83%	10%	7%	—	75%	25%	—	—
6	39	43	8	87	13	—	—	73	27	—	—
4	45	41	6	64	28	6	2	54	38	8	—
5	41	38	9	96	—	4	—	88	12	—	—
—	46	42	12	72	22	3	3	62	23	13	2
2	49	37	11	85	10	—	5	73	14	7	2
4	50	35	6	75	14	7	3	76	12	10	—
8	58	29	4	71	23	3	3	52	24	16	1
7	65	21	7	70	24	3	3	55	26	14	1
6	39	37	11	66	18	7	6	63	26	11	—
4	57	65	9	69	17	10	4	71	17	9	—
7	41	37	9	70	21	5	4	68	12	12	4
8	41	27	16	75	13	7	5	80	15	—	—
—	59	25	17	65	28	5	2	55	20	10	7
33	67	—	—	69	24	4	3	60	17	13	4

Where Parts Business Goes *(continued)*

ship, the negative price image will remain.

The survey results indicate that the perceived price differential between dealer prices and the other sources of supply is only 10 to 20 per cent. In my view, this relatively small perceived difference should be encouraging. The road to getting prices on a more competitive basis may not be as long as first believed. This relatively small differential does reinforce the concept of the negative price image and how the image causes lost sales.

Recent ads in many popular farm newspapers and magazines herald price reductions on many parts and are no doubt directed at altering the negative price image. However, these ads alone will not change the present image. It must be reinforced with the quality, guarantee, and service aspects of price. Foremost, if dealers tell their customers they have equal or lower prices on certain items, then, it must be so. Dealers must appeal to farmers to make price comparisons prior to purchasing. They must make their opportunity to meet competitors prices.

Batteries, oil

Of the products investigated in the survey, the ones that need the greatest attention are batteries and oil. Both items are highly advertised and most farmers can accurately quote the price of each. Dealers sell less of these products to farmers than any other source, mainly because of price or price image. If dealers and manufacturers want two items to use as leaders in altering the price image, these would be prime candidates.

While dealers look toward auto parts houses as the main competition for non-captive parts and supplies, perhaps they should think more about oil distributors. Consider the convenience factor. One of the main reasons farmers indicated they purchased products from dealers was convenience. This is perceived to be convenience while in the dealership on other business.

It is convenient to pick up several items while making the purchases that drew them into the store. But this convenience factor could be easily overcome by the convenience of farm delivery. Distributors, when bringing petroleum products to the farm, could also deliver filters and other interchangeable parts. Many oil distributors are already selling various filters and more are sure to follow.

Oil jobbers will become more sophisticated marketers and will most likely set up files on customer equipment and build inventories of filters, belts, etc., using these files. When farmers call in orders for fuel, their file will alert the salesperson to make suggestions on filters, belts, etc., which will be delivered with the fuel.

Thus, it appears that the already intense competition from the auto supply houses will soon be joined, with heightened competition, from oil distributors. This competition will strike at one of the remaining strengths of the dealers—convenience.

In my opinion, implement dealers are going to have to meet the competitive pressure for interchangeable parts and supplies in more systematic and creative ways. Two specific areas must be addressed.

Prices, merchandising

First, a definite plan must be undertaken to offset the negative price image that is associated with dealer parts departments. This must be accomplished with manufacturing support. Evidence of such plans is being seen in advertisements, but more must be done.

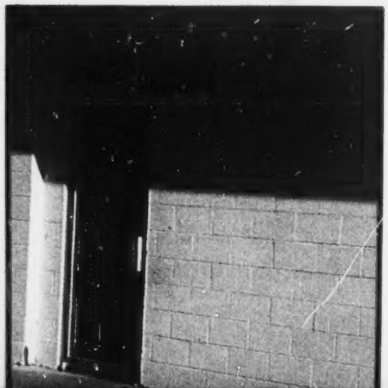
Second, dealers must become better mechandisers. Dealers, traditionally, are very poor merchandisers of their products. Traffic flow, hot spots, impulse items, and power items are terms that dealers must learn more about.

Again, manufacturers should give leadership in educating parts management in merchandising techniques that will increase sales and margin dollars. Dealers should look at product delivery to the farm. They should also build customer files on equipment and parts purchased for each piece. These files should result in a data base from which suggestive selling of parts and equipment repair could be made. For this to happen, dealers must realistically employ a computer.

Another possibility, suggested more than once (and occasionally acted upon): Dealers can open auto supply outlets or get into oil distribution.

Farmers' Alternatives

In many fair-sized farm trading towns, such as Lawrence, Kan., it's not difficult to find alternative sources for many common types of parts and materials required by farm machines.



I&T
SINCE 1886

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

JONES FARM EQUIPMENT CO.
Dothan, Alabama
March 12, 1985

ALLIS-CHALMERS TRACTORS

7060 diesel, 1977 (Good)	6000*
7000 diesel, 1976 (Good)	5000
WD45, 1954 (Rough)	375

DAVID BROWN TRACTORS

1200 diesel, 1969 (Rough)	700
1200 diesel, 1968 (Rough)	1250

MASSEY-FERGUSON TRACTORS

1150 diesel, 1972 (Rough)	2300
1135 diesel, 1975 (Fair)	3100
595 diesel, (Good)	4100*
285 diesel, 1975 (Good)	5000*
275 diesel, 1976 (Good)	3500*
255 diesel, 1976 (Good)	4050
235 diesel, 1976 (Excellent)	4600
235 diesel, 1975 (Good)	4100
235 diesel, 1975 (Fair)	3300
175 diesel, 1966 (Good)	3200
165 diesel, 1971 (Fair)	2675
165 diesel, 1966 (Good)	3150
165 diesel, 1966 (Good)	3000*
165 diesel, 1966 (Fair)	2400
135 diesel, 1974 (Good)	3550
135 diesel, 1971 (Good)	3300*
65 diesel, 1962 (Fair)	1100
35, 1962 (Excellent)	2550*
35, 1959 (Excellent)	2300
35, 1959 (Good)	2050
35, 1957 (Good)	1700
35, 1957 (Good)	1625
35, 1956 (Fair)	1050
35, 1956 (Fair)	1150
TO20, 1951 (Fair)	775
TE20, 1948 (Fair)	750

FORD-FERGUSON TRACTOR

9N, 1943 (Good)	1300

FORD TRACTORS

8700 diesel, 1977 (Good)	5100*
7000 diesel, 1975 (Good)	5600
6600 diesel, 1976 (Good)	5500*
6600 diesel, 1976 (Good)	5600*
5600 diesel, 1976 (Good)	5400*
5000 diesel, 1966 (Fair)	2950
4600 diesel, 1976 (Fair)	3850
4000, 1970 (Good)	4250
4000 diesel, 1970 (Good)	4150
4000 diesel, 1966 (Rough)	2000*
4000 diesel, 1966 (Fair)	3100*
4000 diesel, 1966 (Rough)	2350*
4000 diesel, 1965 (Rough)	850*
4000, 1963 (Rough)	1000
3910 diesel, 1983 (Excellent)	8650*
3000 diesel, 1970 (Good)	3200
3000 diesel, 1970 (Good)	3150
3000 diesel, 1970 (Good)	3300
3000 diesel, 1970 (Good)	3100
3000 diesel, 1969 (Good)	3600
3000 diesel, 1968 (Fair)	2650
3000 diesel, 1968 (Fair)	2750*
3000 diesel, 1968 (Rough)	2150*
3000 diesel, 1968 (Rough)	2250*
2910 diesel, 1983 (Excellent)	8000*
2600 diesel, 1976 (Good)	3475
2000, 1966 (Good)	2850
861, 1960 (Good)	1900*
850, 1956 (Good)	1825
841, 1959 (Good)	2350
841 diesel, 1958 (Fair)	1375
841, 1958 (Good)	1550
650, 1956 (Good)	2250
641, 1958 (Good)	1700
641, 1958 (Excellent)	2750
641, 1958 (Excellent)	2500
Dexta, 1958 (Good)	1375
8N, 1951 (Good)	1675
8N, 1950 (Good)	1550
8N, 1950 (Fair)	1300
8N, 1949 (Fair)	1400
8N, 1949 (Good)	1475
8N, 1949 (Good)	1450
8N, 1948 (Rough)	550
8N, 1948 (Good)	1450
8N, 1948 (Fair)	1000*
8N, 1948 (Rough)	600

INTERNATIONAL HARVESTER TRACTORS

1466 diesel, 1975 (Fair)	4000
1066 diesel, 1975 (Fair)	3700*
1066 diesel, 1973 (Fair)	3750
666 diesel, 1975 (Good)	3700
B414 diesel, 1963 (Good)	1500
384 diesel, cab, 1978 (Excellent)	3750
340, 1965 (Rough)	500*
200, cult., 1955 (Fair)	600
Sup. C, 1953 (Good)	675
Sup. A, 1954 (Rough)	700*
Sup. A, mo., 1953 (Fair)	950
154 Lo Boy, mo., 1968 (Fair)	1400
Cub, cult, plow, 1951 (Good)	1300*
Cub, cult, plow, mo., 1948 (Fair)	875
Cub, 1948 (Good)	1000*
Cub, 1948 (Fair)	800

JOHN DEERE TRACTORS

8430 diesel, cab, duals, 1977 (Fair)	7250
4430 diesel, cab, 1973 (Fair)	6500*
4020 diesel, 1967 (Fair)	3600*
4020 diesel, 1964 (Rough)	3025
3130 diesel, 1975 (Good)	4500
3010 diesel, 1962 (Good)	2900
2950 diesel, 1983 (Excellent)	14,000*
2130 diesel, 1977 (Fair)	2400*
2130 diesel, 1977 (Fair)	2750*
1020 diesel, 1970 (Fair)	1950
820 diesel, 1974 (Rough)	1440
435 diesel, 1960 (Good)	850

KUBOTA TRACTORS

G4200 diesel, mo., (Good)	2850
G4200 diesel, mo., (Good)	2850

LONG TRACTOR

445 diesel, (Fair)	1750

OLIVER TRACTOR

550 diesel, 1958 (Good)	1900

YODER & FREY, INC.
Archbold, Ohio
March 11, 1985

INTERNATIONAL HARVESTER TRACTORS

Sup. C, 1952 (Rough)	460
Sup. C, 1952 (Fair)	700
Sup. C, 1952 (Fair)	600
C, 1948 (Rough)	600
Sup. MTA, 1951 (Rough)	875
Sup. A, 1952 (Fair)	1550
A, (Rough)	400*
A, 1944 (Fair)	1250
A, 1952 (Fair)	1450
A, 1952 (Fair)	1150
A, 1952 (Fair)	1400
A, 1947 (Fair)	825
Cub, (Fair)	1500
Cub, 1959 (Fair)	1300
Cub, (Fair)	1900*
Cub, 1954 (Fair)	900*
Cub, (Fair)	750
Cub Lo-Boy, (Fair)	1300*
154 Lo-Boy, (Fair)	1950
H, 1945 (Fair)	925
H, 1949 (Fair)	650
SH, 1952 (Good)	1500
M, 1947 (Rough)	625*
M, 1950 (Fair)	800
Sup. M., 1952 (Rough)	850
140, 1960 (Fair)	2400
200, 1957 (Fair)	675
300, 1954 (Rough)	1000
300, 1954 (Good)	1200
340, 1960 (Fair)	1400
340, 1958 (Fair)	1475
340, 1960 (Fair)	650*
350, 1960 (Fair)	1200
400, 1956 (Good)	1025*
2405, (Rough)	1400*
424, (Rough)	2800
450, 1957 (Good)	2050
460, 1959 (Rough)	1775
460, 1963 (Rough)	2200*
460, 1960 (Rough)	1025*
460, 1960 (Rough)	1150*
474 diesel,	4000
504, 1964 (Rough)	1250
560, 1961 (Fair)	1800
560, 1960 (Good)	2475
560 diesel, 1967 (Fair)	2400*
560, 1959 (Fair)	2050*
560, (Rough)	1125
606, 1963 (Rough)	3275
606, (Good)	5100
656 diesel, 1966 (Fair)	3500*
656, 1972 (Fair)	3000*
656, 1968 (Fair)	3800*
656, 1969 (Fair)	2800*
656, 1970 (Rough)	4100*
706 diesel, 1964 (Fair)	3650
706, 1965 (Fair)	2400*
706, (Good)	1200*
706 diesel, 1966 (Fair)	1900*
706, 1968 (Fair)	2400
706 diesel, 1967 (Fair)	3500
706 diesel, 1966 (Fair)	3700
706 diesel, 1966 (Fair)	2475
756, 1971 (Good)	3450*
766 diesel, 1970 (Good)	8075
806, 1966 (Fair)	3700
806 diesel, 1964 (Rough)	2400
806, 1963 (Fair)	2950
806, 1965 (Rough)	2100*
806 diesel, 1965 (Fair)	3600
806 diesel, 1964 (Rough)	4100
856, 1968 (Fair)	5600*
856, 1966 (Good)	3100*
856, 1970 (Good)	6600
856, 1970 (Fair)	5900
856, 1970 (Fair)	6350
856 diesel 1968 (Fair)	6300
966, 1974 (Good)	7000
966, 1972 (Fair)	6650
966, 1972 (Fair)	4650
986, 1978 (Good)	10,500
986, 1977 (Good)	10,800*
986, 1978 (Good)	12,500
1066 diesel, 1973 (Fair)	5825
1066, 1973 (Good)	6800*
1066, 1975 (Fair)	7100
1066, 1972 (Fair)	5350
1066, 1974 (Good)	6500*
1066, 1975 (Fair)	5500*
1066, 1981 (Fair)	8200
1086, 1978 (Good)	11,000*
1086, 1979 (Good)	11,250*
1086, 1979 (Good)	13,400
1086, 1977 (Good)	10,900*
1206 diesel 1965 (Good)	5450
1206, 1964 (Fair)	3850
1256, 1969 (Good)	4950
1256, 1966 (Fair)	4950
1256 diesel, 1968 (Fair)	4400*
1456, 1970 (Fair)	5500*
1456, 1970 (Fair)	4900
1466,	4250
1466 diesel, 1975 (Good)	6250
1466, 1970 (Good)	6100
1466, 1973 (Good)	7000
1486, 1979 (Good)	11,500*
1486, 1977 (Good)	13,400*
1566, 1976 (Fair)	6700
1566, 1973 (Fair)	8250*
1586, 1978 (Good)	10,750*
3588, 1982 (Good)	12,250*

MASSEY-HARRIS TRACTORS

444, 1958 (Rough)	875
444, 1954 (Fair)	575

MINNEAPOLIS-MOLINE TRACTORS

Jet Star 3, (Fair)	1300
Jet Star 5, (Fair)	800*
445, (Good)	550
G-1000, (Rough)	3100
A4T-1400, 1972 (Fair)	4200*
U,	125
Jet Star, (Good)	1925

FORD TRACTORS

8N, 1948 (Fair)	1050
8N, 1952 (Fair)	1270
8N, (Fair)	1100*
8N, (Rough)	1150*
8N, 1952 (Good)	1575*
8N, 1949 (Rough)	900
8N,	900
8N, (Fair)	1000
8N, (Good)	700
9N, 1947 (Fair)	975
9N, 1944 (Rough)	950
9N, 1943 (Fair)	1275
9N, 1945 (Fair)	1000
9N, (Rough)	825
800, 1957 (Fair)	2000
900, 1958 (Fair)	1400*
601, 1956 (Rough)	850
601,	1350
3000, 1966 (Fair)	3300
3000,	1250
3000, 1963 (Fair)	2300
4000, 1962 (Good)	3600
5000 diesel, 1965 (Fair)	3000
5000 1967 (Fair)	4450
5000 diesel, 1966 (Good)	4300
5000, 1974 (Fair)	4550*
1210 diesel, 1982 (Excellent)	5900*
4600, 1974 (Good)	7000
860, 1956 (Rough)	1800*
Jub., 1954 (Fair)	1250
Jub., 1954 (Rough)	1300*
Jub., 1954 (Rough)	1100*
Jub., 1953 (Fair)	1625

(Continued on page 48)

Auctions

(Continued from page 24)

Jub., 1953 (Fair)	1550*
Jub., 1953 (Fair)	1550*
640, 1954 (Good)	1750
640, 1957 (Good)	2100*
960, 1957 (Fair)	1575
3400, 1970 (Rough)	3050

FERGUSON & MASSEY FERGUSON

TO-20, (Rough)	875
TO-20,	750
TO-20, (Fair)	750*
TO-20,	950
TO-20,	550
TO-20, 1947 (Fair)	1200*
TO-20, 1946 (Rough)	875
TO-30, 1950 (Rough)	1075
TO-30, (Fair)	1000
TO-20, 1951 (Fair)	1175
TO-35, 1958 (Rough)	2100
35, 1959 (Fair)	1700
35, 1950 (Fair)	1900
35, 1952 (Fair)	2300
35 diesel, 1954 (Fair)	2300
50, 1959 (Fair)	2225
50, 1962 (Fair)	1525
65, (Good)	2800*
65, 1959 (Rough)	1400*
65, 1965 (Fair)	1750
65 diesel, 1960 (Fair)	1400*
85, 1962 (Rough)	1100
90 diesal, 1959	1400*
135, (Fair)	2350
135 diesel, (Fair)	3350
165, (Fair)	3250
165 diesel, 1968 (Fair)	3350
175 diesel, 1970 (Fair)	3600*
255 diesel, (Good)	4900*
275 diesel, 1968 (Fair)	7850
1100, (Fair)	1850*
1130, 1966 (Fair)	3600*
1130, 1968 (Fair)	4150
1135 diesel, 1974 (Good)	6100
1135 diesel, (Fair)	5900
1135 diesel, (Good)	6700*
1135, (Good)	6700*
1805, 1974 (Good)	9200*

DAVID BROWN TRACTORS

1200, 1969 (Rough)	1250
1200 diesel, 1970 (Fair)	2000

JOHN DEERE TRACTORS

A,	600
A, (Good)	700
B,	225
401, 1972 (Fair)	2700*
60, 1958 (Fair)	950
50, 1954 (Rough)	675
520, 1957 (Good)	1950
40, 1955 (Fair)	1125
2130, 1976	5400
720, 1957 (Good)	1850
730 diesel, 1967 (Fair)	2900
1010, 1966 (Fair)	1450*
2010 diesel, 1961 (Rough)	1500*
2020, 1968 (Good)	3800*
2940, 1979 (Good)	11,900
2940, 1982 (Excellent)	13,500*
3010 diesel, 1965 (Good)	3300*
3020, 1966 (Good)	4200*
3020 diesel, 1969 (Fair)	3300*
3020 diesel, 1969 (Good)	5000*
3020 1968 (Good)	3600*
4010, 1963 (Fair)	2600
4010 diesel, 1963 (Fair)	4500
4010 diesel, 1963 (Good)	4900*
4020 diesel, 1968 (Rough)	2400
4020 diesel, 1969 (Fair)	5200
4020 diesel, 1969 (Fair)	6500*
4020 diesel, 1968 (Rough)	3900
4020 diesel, 1969 (Fair)	5150
4020 diesel, 1970 (Fair)	6150
4020 diesel, 1970 (Fair)	6000
4020 diesel, 1969 (Fair)	5900
4020 diesel, 1969 (Good)	4900
4020 diesel, 1970 (Fair)	6400
4040, 1979 (Good)	10,600
4230, 1975 (Good)	9300
4230, 1975 (Fair)	7950
4230, 1977 (Good)	12,300
4230 diesel, 1974 (Fair)	10,600*
4240, 1980 (Good)	19,000
4320, 1972 (Good)	7200
4320, 1972 (Good)	8900*
4430, 1974 (Fair)	11,600*
4430, 1976	10,250
4430 diesel, 1975, (Good)	11,300*
4430, 1976 (Good)	12,300
4430, 1975 (Fair)	9250
4430, 1977 (Good)	14,100
4430, 1975 (Good)	9500
4430, 1976 (Fair)	13,000
4440 diesel, 1980 (Good)	20,000
4440 diesel, 1979 (Good)	18,750*
4440 diesel, 1980 (Good)	20,000*
4520, 1971 (Fair)	7400*
4520, 1970 (Fair)	4600*
5020, 1971 (Fair)	5150
5020, 1967 (Fair)	4250
6030, 1972 (Fair)	6450
7520, 1971 (Good)	11,500*
8430, 1978 (Good)	16,000

CASE TRACTORS

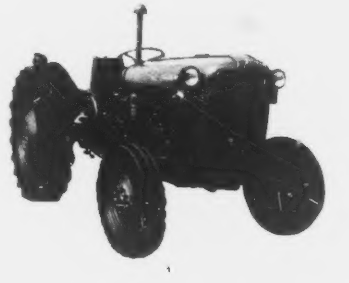
VAC, (Fair)	400
430 diesel, 1962 (Fair)	1200*
580,	850
800,	925
730 diesel, 1965 (Fair)	725
830, (Fair)	910
930 diesel, 1965 (Rough)	2000*
930, 1960 (Fair)	2500
1030, 1964 (Rough)	1400
1410, (Fair)	3750
1270, 1974	3600*
1370, 1975 (Fair)	6250*
1370, 1974 (Fair)	5500*
1370, (Good)	6300*
1370, 1975 (Fair)	4900
1370 diesel, 1975 (Fair)	6800
2290, 1981 (Good)	12,000*
2470, (Fair)	8750*
2670, 1978 (Good)	9100*

ALLIS-CHALMERS TRACTORS

C, 1946 (Rough)	485
G, 1949 (Fair)	1200
G (Good)	1075
G, 1951 (Fair)	1050*
WD, 1946 (Fair)	550
WD-45, 1954 (Good)	975*
D-14, 1962 (Rough)	800
D-17, 1966 (Good)	2500*
D-17, 1960	1650*
D-17, 1965 (Good)	2050
D-19 diesel, (Good)	2000
D-19, (Good)	1550
160, ldr., (Fair)	2800
180 diesel, (Good)	4850
185, 1976 (Fair)	5400*
190 diesel, 1965 (Fair)	1750*

INTRODUCING

IMT 539 Deluxe



Reproduction of Massey-Ferguson 35

Parts Interchangeable

- Live Pto
- Differential Lock
- 3 Cylinder Diesel
- 1 Year Warranty
- Lights & Linkage
- Deluxe Seat

Dealerships Available

Telephone

(214) 539-1942

JKH Equipment

3001 Justin Rd-Flower Mound, Tex 75067 (Dallas Area)

Write In (34) on Reply Card

CALCIUM MATIC

AIR POWERED CALCIUM

+ LIQUID BALLAST PUMP

Calcium Matic

PP100A: Designed for in field and shop use, it has low friction; thus assuring long life, low maintenance cost, and easy to service. It is self-priming, with a constantly variable flow. Delivers approximately 30 GPM, using only 9SCFM; and gives outstanding performance on small air compressors.

OWENS© MFG. CO., INC.

602 18TH STREET

CORBIN, KENTUCKY 40701

FOR ADDITIONAL INFORMATION, CALL: 606/528-2330

TOLL FREE: IN KY – 800-442-0129; USA – 800-626-0184

Write In (35) on Reply Card

190XT diesel, 1966 (Fair)	2900*
190XT, 1965 (Rough)	4800*
200, 1970 (Fair)	4400*
200 diesel, 1972 (Fair)	5200*
220 diesel, 1972 (Fair)	5750
6040, (New)	17 000*
7000, 1977 (Fair)	7200*
7000, 1976 (Good)	7400
7030 diesel, 1970 (Fair)	6250*
7030 diesel, 1977 (Good)	6800
7040, 1975 (Fair)	5800*
7045, 1976 Good)	11,750*
7045, 1976 (Good)	10,700
7580, (Good)	11,000*

OLIVER TRACTORS

77, 1948 (Rough)	550
550, 1959 (Rough)	650*
770, 1950 (Fair)	525
770,	1000
1250, (Good)	2800*
1465, (Fair)	3925
1550 diesel, 1965 (Good)	3400*
1550 diesel, 1968 (Fair)	3150
1600 diesel, 1960 (Fair)	2700
1650 diesel, 1966 (Fair)	3700
1650 diesel, 1965 (Fair)	1800
1655, 1966 (Fair)	3350*
1655, 1963 (Fair)	2325
1750, 1965 (Rough)	2300*
1755, 1972 (Good)	4500*
1850, 1966 (Rough)	3000*
1850 diesel, (Fair)	3000*
1850 diesel, (Fair)	3900
1850 diesel, 1965 (Fair)	2900*
1850, 1966 (Good)	2800*
1955 diesel, (Fair)	4700*
1855 diesel, 1971 (Good)	5900
1900,	2250
1955, 1973 (Fair)	4400*
1955, 1973 (Fair)	5000*
1955 diesel, (Good)	4450
2255 diesel, 1974 (Good)	7500

WHITE TRACTORS

2-70, 1965 (Good)	5800*
2-105, (Rough)	6200*
2-105, (Fair)	6600
2-105, (Good)	6500*
2-135, 1976 (Fair)	10,300*
2-150, (Fair)	5400
2-155 diesel, (Rough)	9200*
4-150, 1974 (Rough)	8500*

COCKSHUTT TRACTORS

570, (Good)	1625
1850 diesel, 1967 (Fair)	3000*
1800 diesel, 1961 (Rough)	1600*

NOTES:
Prices reported are for individual sales at wholesale on an "as is," "cash and carry" basis. Prices reported are not averages.

Condition Classifications:

EXCELLENT: Engine in perfect condition, 400 to 600 hours of use. Rubber—80% tread remaining, no breaks or cracks. Paint—original and bright. General appearance: excellent.

GOOD: Engine in good running condition. Rubber—70% tread remaining, no breaks or cracks. Paint—original or a good repaint job. General appearance: good over-all.

FAIR: Engine possibly in need of a minor overhaul. Rubber—60% tread remaining, some cracking evident in sidewalls. Paint—only fair, weathered and some rust apparent. General appearance: worn, some dents, minor parts (gage covers, etc.) missing or broken.

ROUGH: Engine obviously in need of a major overhaul. Rubber—smooth. Paint—scarred, weathered, rusty. General appearance: dents, ruptures, broken parts, loose wires, components (such as lights) broken, missing or inoperative.

Don't sell too low...
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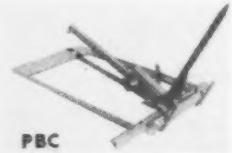

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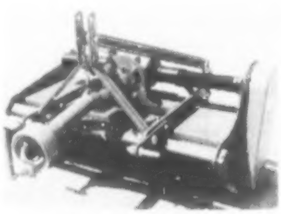

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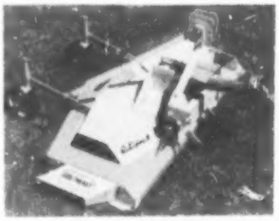

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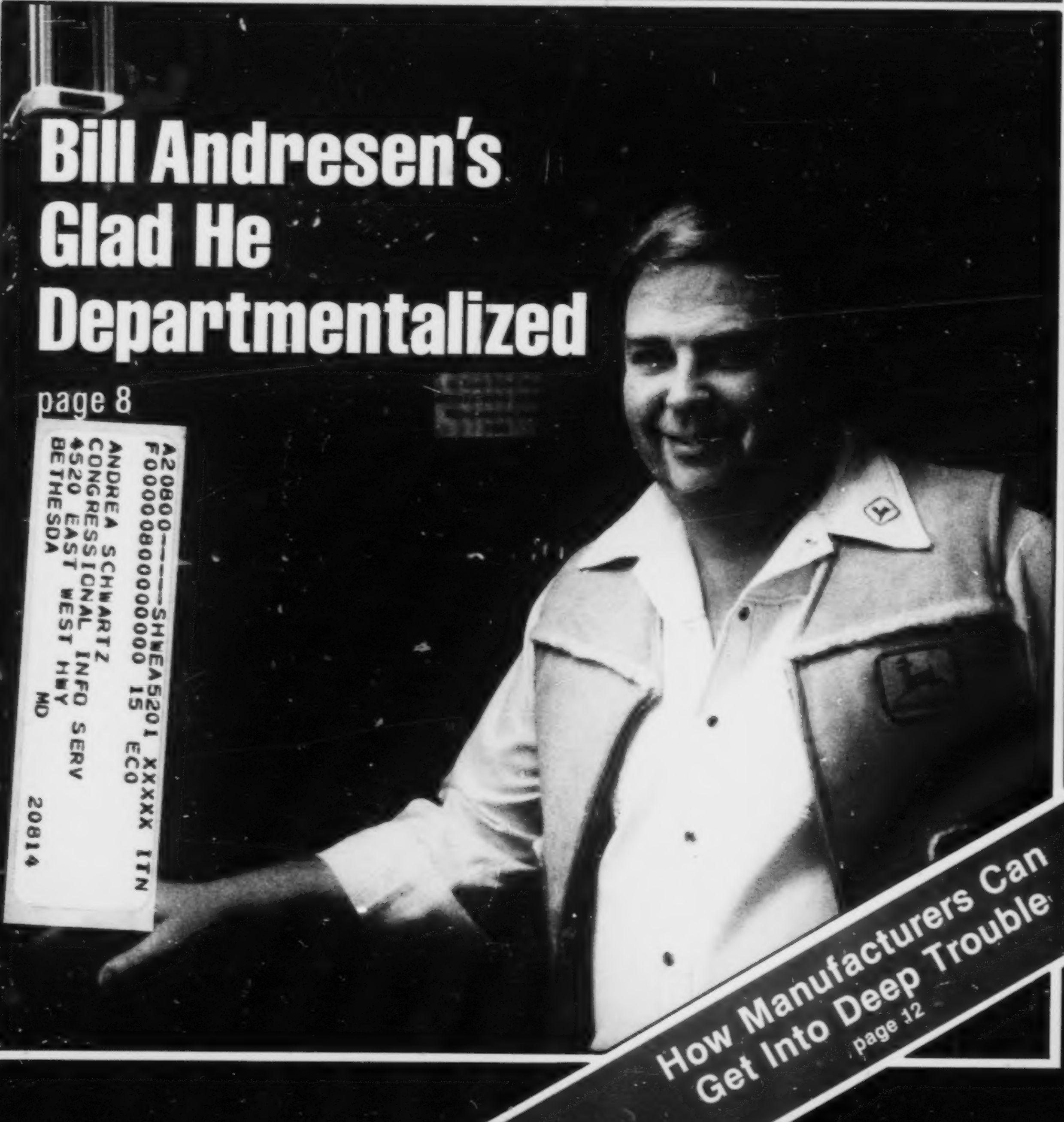
The business magazine of the farm and industrial equipment industry
JUNE 1985

Dealers Talk About Credit, Advertising page 16



Bill Andresen's Glad He Departmentalized

page 8

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How Manufacturers Can Get Into Deep Trouble

page 12

Implement & Tractor

The business magazine of the farm and industrial equipment industry.

June 1985 • Vol. 100 • No. 8

page 22

8: **Profit Centers Pay Off.** Structuring his dealership into sales, service and parts profit units is helping Bill Andresen avoid financial shock and learn what is really going on.

12: **FEMA Keys on Fundamentals.** The Spring Management Clinic takes on a positive back-to-basics attitude in Albuquerque.

16: **The Short-Leash Benefit; Spending the Ad Bucks.** Dealers share their ideas on credit, collections and advertising in reports on two recent For Dealers Only surveys.

18: **Updating the Sales Forecast: Slower 1985, Better 1986.** Industry marketers see a 5 per cent decline in retail dollar volume, but figure lawn-and-garden will rise 8 per cent.

22: **Farm Equipment Imports, Exports: Scanning 1984 Performance.** Volume is up in both directions, according to data from the U.S. Dept. of Commerce.

24: **Who's Doing the Operator Manuals?** Here's how some big companies avoid the hidden costs of having a user's guide book that lacks important information.

DEPARTMENTS

I&T Update....................4
Editor's Notebook.............6
Industry in Motion 21
Auction Prices................27
Farm Equipment Patents......29
What's New..................30
New Literature 41
Brown Pages.................45
Classified Ads...............50
Index to Advertisers 50

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I&T Update

Retail Sales Down in Most Categories

U.S. farm equipment retail sales were reported down in the four months through the month of April in all segments except tractors under 40 horsepower, according to the flash report of the Farm & Industrial Equipment Institute.

Unit Retail Sales	April			January-April		
	1985	1984	Pct. Change	1985	1984	Pct. Change
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	7,365	6,218	+18.4	16,722	15,194	+10.1
40-99 hp	4,213	4,201	+ .3	11,998	13,697	−12.4
100-139 hp	1,113	1,441	−22.8	3,294	3,719	−11.4
Over 140 hp	1,406	1,792	−21.5	4,102	5,339	−23.2
Total 2-wheel drive	**14,097**	**13,652**	**+ 3.3**	**36,116**	**37,949**	**− 4.8**
4-wheel drive						
Under 200 hp	88	205	−57.1	305	641	−52.4
Over 200 hp	193	271	−28.8	559	1,031	−45.8
Total 4-wheel drive	**281**	**476**	**−41.0**	**864**	**1,672**	**−48.3**
Total All Tractors	**14,378**	**14,128**	**+ 1.8**	**36,980**	**39,621**	**− 6.7**
S-P Combines	295	457	−35.4	1,441	2,467	−41.6
Balers (under 200-lb. bales)	496	491	+ 1.0	1,404	1,640	−14.4
Forage Harvesters (shear-bar type)	114	151	−24.5	423	516	−18.0
Mower-Conditioners	911	819	+11.2	2,571	2,700	− 4.8

It's Deutz-Allis Now; Roy Uelner Named President

Allis-Chalmers Corp. and Klockner-Humboldt-Deutz AG (KHD) of West Germany made it official May 24. KHD bought major elements of A-C's farm equipment business and its related credit subsidiary, naming the operation Deutz-Allis Corp.

Manfred Hopf, KHD's vice-president of farm equipment, is chairman of Deutz-Allis and Roy W. Uelner, who had headed A-C's farm equipment business, is president and chief executive officer.

Raymond E. Dague, formerly vice-president of international sales for A-C ag equipment, is vice-president, marketing, of Deutz-Allis. Warren R. Higgins, formerly general manager and vice-president of the ~~Combige Div~~. of A-C is vice-president, Combine, for the new firm.

Dieter Ullsperger, vice-president and chief financial officer of KHD, is chairman of Deutz-Allis Credit Corp. and Uelner is president. Leslie J. Wilson, who was general manager of A-C Credit Corp., is executive vice-president of the credit corporation.

Activities of the Deutz Corp., Atlanta, Ga., which has been marketing Deutz-Fahr farm equipment in the U.S., will be merged with Deutz-Allis at the new firm's headquarters in West Allis, Wis., by the end of the year. The headquarters will be in space leased by Deutz-Allis from A-C.

KHD paid Allis-Chalmers approximately $107 million in cash. A-C will also have an opportunity to participate in future profits of the new business.

Hesston Cuts Losses, Sales in 1st Quarter

Hesston Corp. has reported a loss of $2.37 million on consolidated sales of $37.3 million for the first 1985 quarter compared with a loss of $2.81 million on sales of $42.2 million a year earlier.

Said Howard Brenneman, Hesston president: "Farmers are taking a 'wait and see' attitude on purchases because of uncertainty created by indecision on national farm policy, mergers and rumors of mergers of farm equipment manufacturers, a surplus of farm machinery in dealers' inventories and the prospect that commodity prices will continue at their current levels."

Deere Earns $35 Million In Second Quarter

Deere & Co. earned $34.8 million in the second quarter of 1985 compared with $39.3 million in the same 1984 period. Worldwide sales to dealers in this year's second period were $1.1 billion compared with $1.2 billion a year earlier.

Net income for the first half was $6.6 million, compared with $41.3 million a year earlier. Sales were $1.9 billion vs. 1984's $2.1 billion.

Deere reported North American farm equipment production tonnage was 21 per cent lower than in 1984's first half, mainly due to lower tractor output and a 51-day shutdown of the combine works. Deere also said that the cost of retail sales incentives is high in response to "inventory liquidation efforts by farm equipment competitors...."

Trade receivables, largely dealer inventories, were $2.998 billion April 30, compared with $3.049 billion a year earlier and $2.847 billion Oct. 31, 1984. Ag receivables are said to be down, but those for industrial equipment are up.

Auction Called Off: White Farm's Future Awaits Court Actions

A flurry of legal action in late May cancelled a scheduled and advertised May 29 auction of White Farm Equipment's U.S. assets, and pushed the machinery builder's future into court.

Bankruptcy judges will apparently have to decide where, when, how and if Borg Warner Acceptance Corp. will collect some $148 million owed BWAC by WFE in the U.S. Others also want money from WFE.

Meanwhile, in Canada, a June 14 deadline was set for potential buyers to submit proposals for taking over White Farm Mfg. Canada, Ltd. The Canadian firm owes BWAC $66 million, and is in receivership under Peat Marwick Ltd.

Topping the list of U.S. legal actions was a restraining order issued May 22 by a Cleveland, Ohio, federal judge. He acted at the request of a trustee of the bankrupt White Motor Corp., former WFE parent. The trustee argued the proposed BWAC sale of WFE assets would financially harm the White Motors trust fund.

The trustee wants the case handled in Cleveland. The United Auto Workers, filing a motion to protect union workers and retirees, also wants hearings in Cleveland, where the White Motors bankruptcy was handled in 1980.

But BWAC and WFE filed motions asking for transfer of all cases to federal courts in Chicago, near both companies' main offices.

And in Topeka, Kan., three custom cutters filed an involuntary bankruptcy petition against WFE, in a matter involving two used model 8900 White Farm combines and a $20,000 down payment.

Through it all, the parts and service operations of WFE remained in operation.

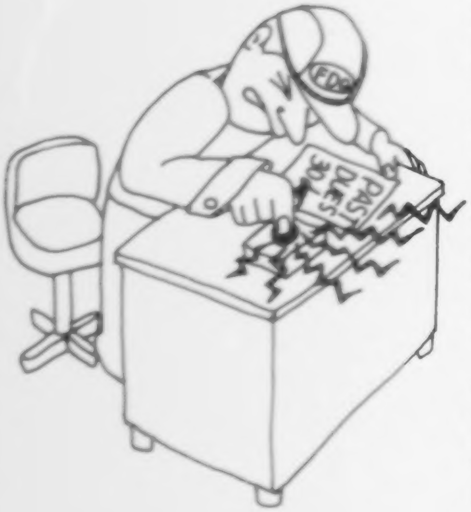
BWAC wants payment

White Farm's potentially fatal troubles began March 26 when BWAC demanded repayment on its loans. Seeing a continued weak farm machinery market, BWAC wanted to get what it could out of White's

(Continued on page 40)

FDO survey reports on credit, advertising:

THE SHORT-LEASH BENEFIT, SPENDING THE AD BUCKS



By Scott Nesbitt

■"DO YOU know any manufacturer offering an electrode that can be activated from the office by pushbutton and implanted in customers' (tender body part) when credit is granted?"

That was one dealer's wry comment on the subject of credit and collections, the focus of I&T's For Dealers Only survey that appeared in the February, 1985, issue.

The survey found that among 55 dealers responding, 27 had more trouble collecting slow-pay accounts in 1984, compared to 1983, while 25 had about the same experience and three had less trouble.

One difference between groups was profound: The more-trouble dealers wrote off an average of $11,190 in bad debts in 1984, compared to an average of $1,727 for the others.

The collection methods used by the two groups were about the same, with about half using a personal visit to the customer, a fourth using telephone calls, and a fourth using letters. One dealer wrote that he had good luck using a letter that stated "final notice before suit," and another said a letter from an attorney helped speed payments.

Also similar was the amount of credit issued, with the more-trouble dealers reporting that accounts and notes receivable were an average of 9.6 per cent of total assets, compared to 9.9 per cent of assets for the same-or-less trouble group.

Where there seemed to be a distinction was on the question "After how many days do you consider an account past due?"

Number of Days to Past Due	Same Trouble Group	More Trouble Group
30	54%	38%
60	25%	38%
90	21%	20%
120	0%	4%

It's hard to draw solid cause-and-effect relations from such a small group, but those figures do suggest that the dealers who keep a short leash on debtors may experience less collection difficulty.

Despite the trouble many obviously experience with credit, none of the respondents have a policy of absolutely no credit. Six use a bank credit plan (like Farm Plan) for credit, while nine offer a charge-card service like Visa or MasterCard, and 26 reported they give credit only to a few good customers.

Join FDO—It's FREE!

The free exchange of ideas and facts is the notion behind our For Dealers Only survey appearing each month inside the front cover of *Implement & Tractor.*

If you find the information from FDO interesting and possibly useful, you can make it even better for yourself by taking part in the survey. The postage is paid and the survey takes just a moment to complete.

And if you have an idea for a topic FDO should cover, jot a note on the survey form. We'd like to hear from you.

One dealer who said he did not write off any bad debts in 1984 commented that "every customer has good credit—until he abuses it. Credit," he wrote, "is like shaving. Just do it yourself every day with a phone call or personal call."

Service gets short end of ad budgets

Wholegoods sales may be depressed, but that's where dealers prefer to spend their advertising money, according to responses to the I&T For Dealers Only survey that ran in the January, 1985, issue.

While wholegoods got the biggest share of revenues, the service department got the least. Among the 60 survey respondents, here's how advertising budgets were apportioned:

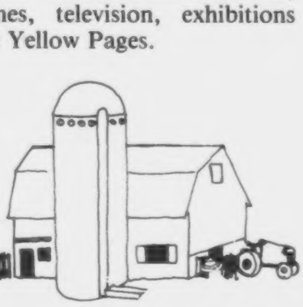
	Per Cent
New wholegoods	33.8
Used wholegoods	19.5
Lawn/garden	16.8
Parts, accessories	8.6
Dealership in general	8.3
Financing	7.5
Service department	5.5

Only four respondents said terms and procedures for suppliers' co-op ad programs were complicated and difficult. The rest said they were clear and easy to use. Forty-nine said they advertised at least once a month, while 11 did so only a few times each year. None said they never advertise.

Spending on advertising and promotion gained as a portion of gross sales volume over the last three years, with a reported average of 1.6 per cent of revenue in 1984, compared with 1.5 per cent in 1983 and 1.4 per cent in 1982. This could be due, however, to a fixed ad budget and shrinking gross revenues over the period covered.

THEY WEREN'T KIDDING!!!

Newspapers were the most popular place to spend that money, being selected by 63 per cent who answered the question: "Which advertising medium seems to work best for you?" Other media used were direct mail (28 per cent), radio (15 per cent) and, with less than 5 per cent each: classified ads, magazines, television, exhibitions and the Yellow Pages.



The dealers' report to I&T on their advertising and promotion habits is somewhat skewed because only 18 of the 60 said they include demonstrations, both public and individual, in that account.

Most of the dealers, 54 of 60, advertised in the farm market, while 41 worked the consumer lawn/garden field. Eighteen advertised general service and parts, including automotive, while eight hit industrial/construction and five went after the professional landscape market. I&T

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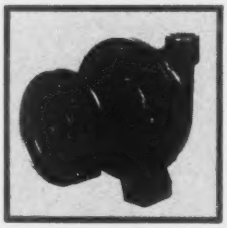

Model FMC-MAG
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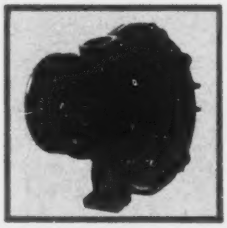

FMCH-MAG
Counter Clockwise Rotation 1¼" x 1" Straight Centrifugal Pump with Grease Lubricated Lip-type Seals

FMC-CW-150-MAG
Clockwise Rotation 1½" x 1¼" Straight Centrifugal Pump with Mechanical Seal

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UPDATING THE SALES FORECAST:

SLOWER 1985, BETTER 1986

Industry marketers see a 5 per cent decline in retail dollar volume. Biggest gainer: lawn/garden equipment, figured to rise 8 per cent this year.

By Bill Fogarty

■THE RETAIL sales outlook for 1985 and 1986, which was generally flat when reported by the Farm & Industrial Equipment Institute in January, looked more downscale in its May updating.

The forecast, a consensus of the views of farm equipment marketers, was delivered at the Spring Marketing & Management Conference of FIEI in Washington, D.C., by David Koentopf (Steiger Tractor).

In January, the group forecast that all field equipment would experience a total increase, in retail dollars, of 1.7 per cent in 1985. The May prediction was for a decline of 5 per cent. As for all farmstead equipment, both the January and May forecasts called for no change from 1984 volume.

The updating of the forecast included a new feature—an estimate about parts sales volume among participating companies. Field equipment parts sales are expected to go up 3 per cent in 1985 and another 3 per cent in 1986. Farmstead equipment parts are expected to rise 5 per cent in 1985 and 2.5 per cent in 1986.

The forecast figures are arrived at by establishing a median percentage from the participants' individual estimates. Each forecaster is expected to indicate the percentage of change up or down in the product areas in which his company is involved, but in terms of what he thinks the industry, not just his firm, will do.

Where unit numbers are available on a product, the percentages are converted accordingly.

Ranges large and small

The tables with this article are self-explanatory, but a consideration of the ranges of sales estimates in certain key product areas is informative. It demonstrates the variance of opinion that sometimes exists in charting the sales outlook for a year or two.

Traditionally, the range of opinion on some products, such as tillage tools, has been wide. That tradition continues, though not as dramatically as in the past. While 12 manufacturers of disk harrows expect anywhere from a 20 per cent decline to a 20 per cent increase in unit sales volume, chisel plow makers mostly cluster between minus 5 and plus 5 per cent.

Also traditionally, when seven to

(More...)

U.S. RETAIL SALES FORECAST

(In units)

		FORECAST FOR 1985, 1986			
	ACTUAL SALES,	REPORTED IN MAY		REPORTED IN JANUARY	
PRODUCT	1984	1985	1986	1985	1986
Farm Tractors					
Under 40 HP	51,010	50,000	51,250	50,000	51,000
40-99 HP	38,253	36,750	38,750	39,000	40,000
100 HP and Over	24,495	23,000	24,000	24,500	24,100
4-Wheel Drive	3,975	3,500	3,800	3,800	4,200
All Tractors	117,733	114,500	117,000	117,300	119,800
S-P Combines	11,422	10,500	11,000	11,650	12,000
Cornheads	6,419	6,100	6,500	6,600	7,000
Balers*	8,314	7,750	7,950	8,200	8,200
Balers**	11,000E	10,780	11,000	11,200	11,600
Forage Harvesters	3,538	2,950	3,100	3,100	3,300
Windrowers	2,591	2,500	2,600	2,600	2,700
Mower-Conditioners	13,057	12,500	12,800	13,100	14,000
Grinder-Mixers	2,349	2,400	2,800	2,800	3,000

Source: Farm & Industrial Equipment Institute
*Bales under 200 lbs. ** Bales over 200 lbs. E I&T estimate

OTHER FORECASTS

Product	Pct. Change Forecast in May 1985	1986
All Field Equipment	−5.0	.....
Manure Spreaders	−2.0	same
Moldboard Plows	−5.0	same
Disk Harrows	−0.3	same
Field Cultivators	−2.5	+4.5
Chisel Plows	same	+5.0
Parts, Field Equip.	+3.0	+3.0
All Farmstead Equip.	same	.....
Portable Augers, Elevators	same	same
In-Bin Dryers	same	+2.0
Batch/Continuous Dryers	−4.0	same
Dairy/Beef Equipment	same	same
Grain Bins	+2.5	+1.5
Milking Machines	same	same
Parts, Farmstead Equip.	+5.0	+2.5
Lawn/Garden Equipment	+8.0	.....

Source: Farm & Industrial Equipment Institute

nine North American tractor makers have estimated their markets, they have come fairly close to each other. It figures, because they are operating nationwide and with the same product ranges, generally.

But this time there are some departures. Four-wheel-drive tractors are seen declining in unit volume by as much as 20 per cent by two forecasters. Two others see no changes. Between these two, there are five others who see declines of from three to 17 per cent. The median comes out minus 12 per cent.

Consider two-wheel-drive tractors over 100 horsepower. The sunniest of nine estimates is for a 6 per cent rise, but others are less optimistic: one sees it up 2 per cent, one sees it down 2 per cent, three expect a 5 per cent dip, one says down 8 per cent and the least hopeful calls for a 10 per cent slide. Median: minus 6.1 per cent.

Self-propelled combines similarly produce a spread of opinion. The brightest one is for no change; there's one each for 3 and 4 per cent. Then, two see it down 8 per cent and two more say down 11 per cent. Median: minus 8.1 per cent.

The general outlook—estimating retail dollar sales volume for 1985—presented a 35 per cent variance in opinions. One marketer predicted a 25 per cent fall for the industry; but two others predicted a 10 per cent jump. The major concentration was much closer, however. Six predicted no change, 8 estimated a 5 per cent slide, and seven others fell in between. Median: minus 5 per cent.

As participants in the Marketing & Management Conference checked in at the registration desk, they had a chance to pick up the industry flash report for the first four months of 1985. (See the Update page of this issue.) Typical comment:

"If the forecast is right, the rest of the year ought to be great—we'll be playing catch-up with those numbers."

David Koentopf, besides reporting on the forecast to the conference, bade his farewells to the industry. He has resigned as president of Steiger Tractor to accept a senior executive post with the Chicago-based Marmon Group.

Next issue of I&T will report other aspects of the Marketing & Management Conference. I&T

FARM EQUIPMENT IMPORTS, EXPORTS:

SCANNING 1984 PERFORMANCE

Volume is up in both directions, according to data from the U.S. Dept. of Commerce.

By Bill Fogarty

HERE'S A rundown on the 1984 U.S. farm equipment import-export picture, according to the Dept. of Commerce:

- **Farm equipment imports** increased 36 per cent to $1.729 billion.
- **Farm equipment exports** increased 11 per cent to $2.235 billion.

Major sources of imports are shown as follows, with volumes in millions of dollars and increases or decreases from 1983 as percentages:

Canada: 576.6 (+52)
Japan: 309.8 (+52)
West Germany: 223.7 (−10)
United Kingdom: 217 (+33)
Italy: 152.4 (+39)
France: 72.6 (+76)
Netherlands: 46.9 (+43)
Belgium: 27.7 (+17)
Hungary: 11.7 (+385)
Brazil: 11.4 (+77)
New Zealand: 11.2 (−6)
Mexico: 10.1 (−46)

The primary volume of imports comes in the form of tractors, which were valued for 1984 at $873 million. Tractor parts come to another $323 million.

The big four of tractor sales to the U.S. are Japan ($273 million), Canada ($241 million), the United Kingdom ($161 million) and West Germany ($106 million). Tractor parts come predominantly from Italy ($94 million), West Germany ($66 million), the United Kingdom ($42 million), Canada ($28 million), Japan ($27 million) and France ($12 million).

Apart from tractors, sorting out farm equipment imports by product type is difficult because so many types of equipment are grouped together. For instance, "Harvesting Machines (not specified)" takes in about everything from self-propelled combines to potato diggers. Last year, this grouping accounted for over $82 million in imports; parts for harvesting machinery came to another $58 million.

On the other hand, "Mowers Except Lawn Mowers" is a $31 million category of import that can be read by knowledgeable industry watchers with benefit. The major sources are France and the Netherlands, each with over $11 million in sales, mostly of drum- and disk-type mowers.

Exports

Here are the major export markets, according to 1984 Dept. of Commerce data, in millions of dollars, with increase or decrease of volume, by percentage, shown in parentheses:

Canada: 891 (+4)
Saudi Arabia: 257 (−16)
Australia: 214 (+118)
Mexico: 114 (+150)
France: 89 (−9)
United Kingdom: 68 (+4)
West Germany: 67 (−12)
South Africa: 60 (+4)
Belgium: 54 (−2)
Venezuela: 24 (+25)
Greece: 22 (+200)
Japan: 20 (+1)

The United States sold about $421 million in tractors last year and $672 million in tractor parts. The major buyers of tractors were Canada ($260 million), Australia ($73 million), South Africa ($16 million), and Mexico, Saudi Arabia and China ($9 million each).

The big buyers of tractor parts from America include our major tractor customers, but large segments of the market are the factories in Western Europe in which multi-national farm equipment firms put tractors together.

Thus, in 1984 Canada bought $213 million in tractor parts; Mexico took $51 million; Belgium, $40 million, West Germany, $47 million; Britain and France, $46 million each; Australia, $38 million; Brazil, $16 million; South Africa and the Soviet Union, $12 million each, and Singapore, $11 million.

Looking ahead

The outlook for farm equipment exports from the United States in 1985 depends, in I&T's opinion, on several factors:

1. Major North American equipment manufacturers' factories in Europe continuing to source components from the U.S. (In the first quarter of 1985, tractor parts exports were down by 17 per cent worldwide and deeper than that in West European nations.)

2. Recovery of the farm economies of major customer nations—Canada, Mexico, Australia and Venezuela.

3. Saudi Arabia has been a massive buyer of American equipment—over $700 million in the last three years. But if that nation has largely completed the equipment acquisition aspects of its vast agricultural modernization programs, the U.S. industry will feel it, particularly the spray equipment and irrigation segments.

Farm equipment imports appear likely to increase in the short term. Two major tractor firms have shifted some production and assembly to Western Europe in recent years. Tractors and some other types of equipment, originally made in Europe and Japan and retailed in the U.S. over the past decade are stimulating a parts aftermarket.

Over the past six years, the U.S. has fared well in its export markets for farm equipment. Here's how it has gone:

	Exports	Imports
Year	**(in millions)**	
1979	$ 2,187	$1,880
1980	2,631	1,773
1981	2,942	1,550
1982	2,378	1,180
1983	2,014	1,347
1984	2,235	1,729
Total	**$14,387**	**$9,459**

I&T

INTERNATIONAL

I&T
SINCE 1886

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

JONES FARM EQUIPMENT CO.
Dothan, Alabama
April 9, 1985

ALLIS-CHALMERS TRACTORS

7040 diesel, 1976 (Fair)	3000
5040, 1977 (Rough)	1300
D19, LP, 1962 (Fair)	1000*

CASE TRACTORS

1190 diesel, 1980 (Good)	3850
430 diesel, 1965 (Good)	1550

DAVID BROWN TRACTORS

990 diesel, 1968 (Fair)	1000
880 diesel, 1968 (Good)	1200*

MASSEY-FERGUSON TRACTORS

1135 diesel, 1975 (Fair)	3000
1085 diesel, 1977 (Fair)	4000*
590 diesel, (Fair)	3000
285 diesel, 1975 (Good)	6000*
275 diesel, 1975 (Fair)	3000
270 diesel, (Excellent)	10,500*
265 diesel, 1975 (Fair)	3100*
175 diesel, 1971 (Rough)	2100*
175 diesel, 1970 (Good)	3500
165 diesel, 1973 (Good)	3400
165 diesel, 1971 (Good)	3100
165 diesel, 1968 (Good)	3350
165 diesel, 1968 (Good)	3300
165 diesel, 1968 (Rough)	2100
150 diesel, 1968 (Rough)	1600
2135 diesel, (Fair)	1750
135 diesel, (Excellent)	4575
135, 1972 (Good)	3500*
135 diesel, 1967 (Fair)	2600*

FERGUSON TRACTORS

65 diesel, 1962 (Good)	2100*
50, 1964 (Good)	2150*
50, 1963 (Good)	1850
35 diesel, 1960 (Good)	1400
35, 1956 (Good)	1600*
TO30, 1952 (Fair)	875
TO30, 1952 (Rough)	725
TO30, 1952 (Fair)	950
TO20, 1949 (Good)	1100*

FORD-FERGUSON TRACTORS

9N, 1946 (Good)	1400*
9N, 1944 (Fair)	800
9N, 1944 (Fair)	825
9N, 1943 (Rough)	600
9N, 1943 (Rough)	550
9N, 1941 (Rough)	375
9N, 1941 (Rough)	325

FORD TRACTORS

8000 diesel, 1972 (Good)	3900
7700 diesel, 1977 (Fair)	6500
6600 diesel, 1975 (Good)	4750*
5000 diesel, 1974 (Fair)	3400
5000 diesel, 1974 (Excellent)	4750
5000 diesel, 1971 (Good)	3950*
5000 diesel, 1971 (Excellent)	4500*
4600 diesel, 1976 (Fair)	3600
4600 diesel, 1976 (Fair)	3500*
4000 diesel, 1977 (Rough)	2650*
4000 diesel, 1968 (Good)	3500
4000 diesel, 1968 (Good)	3200*
4000 diesel, 1968 (Good)	2900*
4000 diesel, 1967 (Fair)	2400
4000 diesel, Ind., 1966 (Rough)	2100
4000 diesel, 1966 (Good)	3000*
4000 diesel, 1966 (Fair)	2800*
4000 diesel, 1966 (Fair)	2750*
4000, 1966 (Rough)	1650
3600 diesel, 1975 (Fair)	3400
3000 diesel, 1968 (Fair)	2750*
3000 diesel, 1968 (Fair)	2800*
3000 diesel, 1968 (Excellent)	3600*
3000 diesel, 1968 (Good)	3000
3000 diesel, 1968 (Good)	3000
3000, 1966 (Good)	3100*
2000 diesel, 1968 (Good)	3000
2000 diesel, 1966 (Rough)	2100*
850, 1956 (Good)	2000*
841 diesel, 1958 (Fair)	1200*
640, 1955 (Rough)	900
640, 1955 (Fair)	1300
640, 1955 (Good)	1675
Dexta, 1959 (Fair)	900*
Jub., 1953 (Fair)	1200
Jub., 1953 (Fair)	1325
8N, 1951 (Excellent)	1875
8N, 1950 (Good)	1450
8N, 1948 (Rough)	725
8N, 1948 (Rough)	625
8N, 1948 (Good)	1450
8N, 1948 (Good)	1225

INTERNATIONAL HARVESTER TRACTORS

1206 diesel, 1965 (Rough)	1775*
806 diesel, 1967 (Fair)	2525
766 diesel, 1974 (Rough)	1650
584 diesel, 1978 (Excellent)	5725
574 diesel, 1975 (Excellent)	4950
574 diesel, 1975 (Fair)	2150
504, 1965 (Rough)	650
504 diesel, 1965 (Fair)	850
B414 diesel, 1962 (Good)	1500
400, 1955 (Fair)	400
400, 1955 (Fair)	475
H, 1948 (Rough)	180
C, cult., 1948 (Fair)	425
Cub, mo., cult., plt., 1948 (Fair)	950
Cub, 1948 (Rough)	650
Cub, mo., 1948 (Rough)	570

JOHN DEERE TRACTORS

5020 diesel, 1968 (Rough)	2750
4240 diesel, cab, 1978 (Excellent)	13,000
4240 diesel, 1978 (Excellent)	12,500*
4020 diesel, 1967 (Rough)	2850
3020 diesel, 1967 (Rough)	2000
3130 diesel, (Good)	3500*
2130 diesel, (Good)	3600
2020 diesel, 1969 (Good)	2950
1120 diesel, (Good)	3000
1020 diesel, 1966 (Fair)	1885
40, 1953 (Fair)	625

KUBOTA TRACTORS

L335 diesel, (Excellent)	6000*
L175 diesel,	1500

ENLOW AUCTION CO.
Tulsa, Okla.
April 27, 1985

ALLIS-CHALMERS TRACTORS

190 XT LP, 1967 (Good)	2700
220 diesel, cab, 1971 (Fair)	3850*

DAVID BROWN TRACTORS

1200 diesel, Idr., 1969 (Good)	3550*

CASE TRACTORS

1030 diesel, 1966 (Good)	2700*
1030 diesel, 1967 (Good)	2900*
1070 diesel, 1971 (Good)	4800
1490 diesel, cab, 1980 (Good)	10,000
1194 diesel, 1985 (New)	7610
1194 diesel, 1985 (New)	7710

JOHN DEERE TRACTORS

720 diesel, 1957 (Fair)	850*
650 diesel, 4WD, 1981 (Good)	3575
950 diesel, 1979 (Good)	4950
1020 diesel, 1968 (Fair)	2950*
1120 diesel, 1967 (Fair)	2900*
1520 diesel, 1971 (Fair)	2900
1130 diesel, 1974 (Good)	3500*
1530 diesel, Idr., 1974 (Good)	4450*
2120 diesel, 1969 (Good)	3400*
2130 diesel, 1970 (Good)	3750*
2130 diesel, 1970 (Good)	3700*
2510 diesel, 1967 (Good)	2800*
3010 diesel, 1962 (Good)	2800
3130 diesel, 1975 (Good)	4000*
3130 diesel, 1976 (Good)	4250*
4020 diesel, 1967 (Good)	4450
4020 diesel, Idr., 1969 (Good)	5850*
5020 diesel, 1966 (Good)	4700

FERGUSON TRACTORS

20, 1948 (Fair)	1150
20, 1948 (Good)	1475
20, 1949 (Fair)	1060
20, 1950 (Good)	1300

FORD TRACTORS

9N, 1940 (Rough)	825
9N, 1943 (Good)	1425
9N, 1943 (Fair)	850
9N, 1944 (Good)	1150
9N, 1945 (Good)	1850
8N, 1949 (Good)	1250*
8N, 1949 (Good)	1275
8N, Idr., 1951 (Fair)	1325
8N, 1952 (Good)	1750
NAA, 1953 (Fair)	1500*
NAA, Idr., 1953 (Good)	2150
600, 1955 (Good)	2300
600, Idr., 1957 (Good)	2910
601, 1958 (Good)	2150
631, 1958 (Good)	2550
661, 1960 (Good)	2900
801, Select-O-Speed, 1959 (Good)	1650*
900, 1956 (Good)	2350
900, Select-O-Speed, 1957 (Good)	1800
901, 1960 (Good)	2600
2000 diesel, 1965 (Good)	2700
2000 diesel, 1966 (Good)	2600
2000 diesel, 1966 (Good)	2700

(More...)

GREEN MANUFACTURING INC.
P.O. BOX 408 419-352-9484
BOWLING GREEN OHIO 43402-0408

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Auctions *(continued)*

3000 diesel, 1965 (Good)	2950*
3600 diesel, 1975 (Fair)	3610*
4000 diesel, 1967 (Good)	3050
4000 diesel, 1968 (Good)	3000*
4000 diesel, 1968 (Fair)	2600*
4100 diesel, 1972 (Fair)	3400*
5000 diesel, 1972 (Good)	5200
6000 diesel, 1963 (Fair)	1100

INTERNATIONAL HARVESTER TRACTORS

Cub, 1958 (Fair)	1025
Cub, mo., 1964 (Fair)	1100
Cub, 1965 (Good)	1050
130, 1958 (Good)	1950*
154 Loboy, mo., 1968 (Good)	1825
154 Loboy, mo., 1969 (Good)	1600*
M, 1949 (Good)	650
MTA, road grader, 1953 (Good)	1550
B-414 diesel, 1961 (Fair)	1750
2505, ldr., 1972 (Good)	4350*
656 diesel, 1970 (Good)	4875
684 diesel, cab, 1982 (Excellent)	7800*
1256 diesel, cab, 1968 (Good)	4550*

KUBOTA TRACTOR

210 diesel, 1972 (Good)	2250*

LONG TRACTOR

900 diesel, 1967 (Good)	2600

OLIVER TRACTORS

1800 diesel, 1963 (Good)	1800
1855 diesel, cab, 1971 (Fair)	2550

MASSEY-FERGUSON TRACTORS

35 diesel, 4-cyl, 1957 (Good)	1500
35, 1957 (Good)	1950
35, 1958 (Good)	2200
35, salvage, 1959	950
35, 1959 (Good)	2000
35, 1960 (Good)	2100
35, 1960 (Good)	1925
35, 1961 (Good)	2050
50, 1956 (Good)	2375
65 diesel, 1961 (Fair)	1750*
65, 1961 (Good)	1950
65 diesel, 1962 (Good)	2200
65, 1963 (Good)	2150
135, 1970 (Good)	3200
130 diesel, 1966 (Good)	1700*
165, 1969 (Good)	3225*
165 diesel, 1972 (Fair)	3150*
40, ldr., 1969 (Good)	4250*
40, ldr., 1969 (Good)	4650
40 B, ldr., 1980 (Good)	6600
210 diesel, 1984 (New)	4450*
235 diesel, 1976 (Good)	4850
235 diesel, 1976 (Fair)	4050*
255 diesel, 1978 (Good)	5700
265 diesel, 1979 (Good)	5400
282 diesel, 1984 (Excellent)	8500*
1085 diesel, 1975 (Fair)	4950
1135 diesel, cab, 1978 (Good)	5750*
2745 diesel, cab, 1981 (Excellent)	11,250*

YODER & FREY, INC.
Archbold, Ohio
April 8, 1985

INTERNATIONAL HARVESTER TRACTORS

A, 1951 (Rough)	850
A, 1944 (Rough)	1175
A, 1951 (Rough)	1550*
A, 1947 (Rough)	1550*
Cub, 1957 (Fair)	1100*
Cub, 1950 (Rough)	900
Cub, 1960 (Good)	2100
Cub Lo-Boy, 1961 (Fair)	1300*
C, 1952 (Fair)	500
C, 1949 (Fair)	660
C, 1949 (Rough)	550*
H, 1942 (Good)	675
H, 1950 (Fair)	625
H, 1945 (Rough)	525
H, 1952 (Good)	1000
M, 1947 (Rough)	530
M, 1949 (Rough)	410
M, 1950 (Fair)	700
M, 1950 (Good)	675
M, 1950 (Rough)	650
Sup. M, 1952 (Fair)	925
Sup. M, 1952 (Fair)	750*
300, 1957 (Rough)	1400*
300, 1958 (Fair)	875
400, 1954 (Rough)	750
400, 1954 (Rough)	975
400, 1958 (Good)	1300*
2404, 1966 (Fair)	1925*
434, (Good)	3300
450, 1958 (Fair)	875
450, 1958 (Fair)	600
450, 1957 (Good)	925*
454 diesel, 1971 (Rough)	3200*
460, 1960 (Fair)	1050
460 diesel, 1959 (Rough)	950*
460, 1960 (Rough)	1300*
460, 1962 (Rough)	975
560, 1960 (Fair)	2100
560, 1960 (Fair)	1250*
560, 1959 (Rough)	2100
560 diesel, 1960 (Fair)	1725
606, ldr., 1967 (Fair)	4050
656, 1970 (Fair)	3300*
656, 1970 (Fair)	2500*
656, 1970 (Good)	4350
656, ldr., 1968 (Fair)	4050
656 diesel, 1967 (Rough)	3700
706 diesel, 1966 (Good)	3400
706 diesel, 1965 (Fair)	2750
706 diesel, 1965 (Rough)	3200*
706, 1967 (Good)	2900
806 diesel, 1964 (Rough)	2600*
806 diesel, 1965 (Fair)	3000
806 diesel, 1963 (Rough)	1350
806 diesel, 1964 (Fair)	2200
826 diesel, 1969 (Fair)	6250*
826, 1964 (Fair)	1800*
856 diesel, 1968 (Fair)	5200*
856 diesel, 1971 (Fair)	4400*
966 diesel, 1972 (Rough)	5900*
966 diesel, 1975 (Fair)	5100*
966 diesel, 1971 (Fair)	4300*
986 diesel, 1976 (Excellent)	11,800*
986 diesel, 1977 (Good)	10,500*
1066 diesel, 1974 (Good)	5500*
1066 diesel, 1976 (Good)	8700
1066 diesel, 1974 (Good)	7500
1066 diesel, 1976 (Good)	8600
1066, 1975 (Fair)	8000
1066, 1975 (Good)	8750*
1066, 1973 (Excellent)	9500
1086 diesel, 1975 (Fair)	8900*
1086 diesel, 1978 (Good)	9800
1086, 1973 (Fair)	7100
1086 diesel, 1978 (Good)	12,550
1206 diesel, 1964 (Good)	5050
1206 diesel, 1964 (Good)	3400*
1256 diesel, 1969 (Good)	4800
1466 diesel, 1974 (Good)	8500
1466 diesel, 1976 (Rough)	5000*
1466 diesel, 1975 (Good)	6950
1466 diesel, 1972 (Good)	7150*
1566 diesel, 1974 (Good)	8300*
1586 diesel, 1978 (Good)	11,700*
3288 diesel, 1982 (Good)	15,000*
3588 diesel, 1978 (Fair)	9900*

FERGUSON & MASSEY FERGUSON

F-40, 1961 (Good)	2100
TO-35, 1958 (Fair)	1700
65 diesel, 1961 (Fair)	1900*
65, 1960 (Rough)	1400*
65 diesel, ldr., 1964 (Fair)	2000
65, 1958 (Fair)	2800*
165 diesel, 1965 (Good)	2925
165, ldr.,1974 (Rough)	3900
175, 1966 (Good)	3850
265 diesel, 1976 (Fair)	5400*
275, 1979 (Good)	4750*
1080 diesel, 1975 (Good)	4700
1085 diesel, 1975 (Fair)	5750
1100 diesel, 1969 (Rough)	3600
1100, 1969 (Rough)	1825*
1130 diesel, 1969 (Rough)	3600*
2775 diesel, 1979 (Good)	10,300*

FORD TRACTORS

Jubilee, 1954 (Rough)	1300
Jubilee, 1953 (Good)	2375
8N, 1951 (Fair)	1200*
8N, 1948 (Rough)	1200
8N, mo., 1945 (Rough)	1000
8N, 1950 (Rough)	1400*
8N, 1947 (Rough)	1200
8N, 1948 (Good)	1500
9N, 1943 (Fair)	1150
9N, 1941 (Fair)	1075
9N, 1943 (Fair)	900*
601, 1956 (Good)	2325
600, 1960 (Rough)	1825
860, 1956 (Rough)	2400
841, 1957 (Fair)	2000*
2000 diesel, 1965 (Fair)	2400*
2000 diesel, 1967 (Fair)	2100*
3000 diesel, 1965 (Fair)	2425
3000 diesel, 1973 (Fair)	2950*
3000 diesel, 1973 (Fair)	2500*
4000, ldr., 1972 (Fair)	5475
4000, Select-O-Speed, 1970 (Fair)	18,000
4000 diesel, 1964 (Rough)	2400*
5000 diesel, 1967 (Rough)	3350
5000 diesel, 1971 (Fair)	4000*
5000, 1973 (Fair)	4000*
9000 diesel, 1971 (Fair)	4900*
TW-20 diesel, 1980 (Good)	14,000*
9700 diesel, 4WD, 1979 (Fair)	12,000*
9700 diesel, 1978 (Good)	7900*
961, 1958 (Rough)	1575

OLIVER TRACTORS

77, 1953 (Rough)	350*
77, 1953 (Fair)	1075
550, 1961 (Rough)	500
770, ldr., 1960 (Fair)	1150
770, 1962 (Good)	1800
1600 diesel, 1962 (Fair)	1300*
1650, 1964 (Rough)	1575
1655, 1972 (Good)	3850
1655 diesel, 1973 (Fair)	3500
1655, 1973 (Fair)	3100
1755, 1965 (Fair)	3200*
1755, 1972 (Fair)	5300
1800, 1973 (Fair)	4600
1850 diesel, 1965 (Fair)	2950*
1850 diesel, 1965 (Rough)	3000
1855 diesel, 1972 (Fair)	4500*
1855 diesel, 1969 (Fair)	4350
1950 diesel, 1967 (Good)	3700*
1955, 1972 (Fair)	4500*
2150, 1967 (Rough)	4000
2255, 1968 (Good)	5800*

ALLIS-CHALMERS TRACTORS

B, 1947 (Fair)	800
C, 1950 (Rough)	1200
G, 1954 (Fair)	800
G, 1949 (Good)	1200*
WD-45 1955 (Fair)	1000
WD-45 1956 (Good)	1100*
D-17, 1962 (Rough)	1600
D-17, 1967 (Fair)	1375*
D-17, 1959 (Fair)	1600*
D-17, 1962 (Fair)	1175
D-17, 1961 (Rough)	1100*
D-19, 1964 (Fair)	1350*
190XT diesel, 1969 (Fair)	4300*
190XT, 1970 (Fair)	5750
190XT, 1969 (Fair)	1950*
190XT diesel, 1965 (Good)	3250*
190XT, 1968 (Fair)	2750*
200 diesel, 1972 (Fair)	5300*
200 diesel, 1972 (Good)	5400*
220, 1974 (Good)	4700
200, 1974 (Fair)	3900*
220, 1971 (Fair)	3600*
7030 diesel, 1975 (Fair)	4650
7045, 1977 (Fair)	9250*
7045, 1974 (Fair)	6300*

JOHN DEERE TRACTORS

A 1949 (Fair)	490
B, 1950 (Fair)	570
H., 1950 (Fair)	900
LA, 1943 (Rough)	725
MT 2xPl., 1953 (Fair)	950*
G, 1946 (Rough)	350*
50, 1954 (Good)	1200
60, 1955 (Fair)	900
720, 1959 (Fair)	1150*
2020, 1970 (Fair)	3625
2510, 1967 (Fair)	2900*
2640 diesel, ldr., 1979 (Good)	10,300
3010, 1961 (Good)	2600*
3020 diesel, 1967 (Good)	4400*
3020, 1965 (Fair)	3900
3020 diesel, 1964 (Fair)	3300*
3020 diesel, 1968 (Fair)	4750
3020, 1964 (Fair)	2600
4010 diesel, 1962 (Fair)	3900*
4010 diesel, ldr., 1963 (Good)	5000*
4020 diesel, 1965 (Fair)	4800*
4020 diesel, 1970 (Good)	6600
4020 diesel, 1968 (Good)	7400
4020 diesel, 1968 (Fair)	4425
4020 diesel, 1965 (Fair)	4500*
4020 diesel, 1967 (Fair)	4800
4020, 1965 (Fair)	4250
4020 diesel, 1965 (Fair)	4500*
4020 diesel, 1964 (Good)	4875
4020 diesel, 1965 (Fair)	4950
4020 diesel, 1966 (Good)	5200*
4020 diesel, 1965 (Good)	4600
4240, 4WD,1979 (Excellent)	12,000*
4320 diesel, 1973 (Good)	7850*
4430 diesel, 1977 (Good)	9500
4430 diesel, 1979 (Good)	12,700*
4430 diesel, 1976 (Good)	12,100*
4430 diesel, 1975 (Excellent)	10,650
4430 diesel, 1976 (Good)	15,000
4430 diesel, 1975 (Good)	11,100*
4430, 1966 (Fair)	3200
4430 diesel, 1975 (Good)	10,000*
4430 diesel, 1974 (Fair)	9950
5020 diesel, 1969 (Rough)	3500
6030 diesel, 1975 (Fair)	11,500*
6030 diesel, 1973 (Good)	10,100*
7020 diesel, 1970 (Fair)	8100*

WHITE TRACTOR

2-105 diesel, 1977 (Rough)	4700*

MINNEAPOLIS-MOLINE TRACTORS

U-302, 1965 (Fair)	1600*
M-602, 1958 (Good)	1600
M-602, 1958 (Good)	1800*
G-1050, 1965 (Good)	3000
Z, 1947 (Fair)	350*

DAVID BROWN TRACTORS

1200, 1969 (Good)	3350
2090 diesel, 1980 (Good)	10,600

CASE TRACTORS

430 diesel, 1965 (Fair)	1325
770 diesel, 1973 (Rough)	3800*
830 diesel, 1965 (Good)	2100*
880, 1964 (Fair)	1400
930 LP, 1967 (Rough)	1700*
930, 1965 (Fair)	1200*
930 diesel, 1967 (Fair)	2400*
930 diesel, 1966 (Rough)	2200
1030 diesel, 1967 (Fair)	2750
1030 diesel, 1962 (Rough)	1750*
1030 diesel, 1964 (Fair)	3750
1070 diesel, 1974 (Rough)	2500*
1070 diesel, 1975 (Good)	6000*
1175 diesel, 1975 (Rough)	5300*
1175 diesel, 1974 (Rough)	3500*
1175 diesel, 1973 (Fair)	4100*

COCKSHUTT TRACTORS

560, 1962 (Fair)	650
1800, 1964 (Rough)	1000*
1850 diesel, 1965 (Rough)	2800*

DEUTZ TRACTOR

DX 140 diesel, 1980 (Excellent)	12,150*

STEIGER TRACTOR

Bearcat II diesel, 1971 (Good)	14,000

Implement & Tractor

The business magazine of the farm and industrial equipment industry JULY 1985

Dealers' Shop Labor Rates page 16

Deutz and Allis-Chalmers Tie the Knot

page 8

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Conventions, Meetings, Shows

page 31

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INTERTEC
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Implement & Tractor

The business magazine of the farm and industrial equipment industry.

July 1985 • Vol. 100 • No. 9

8: **Deutz and Allis Get Hitched.** By 1986: One company, one contract, one product line, Deutz-Allis officials tell the dealer organization.

12: **Service Is (Almost) Their Only Business.** An emphasis on parts, service and profit-center management has given Van-Wall Equipment in Perry, Iowa (and elsewhere), the strength to hang on when wholegoods sales are down.

16: **FDO Report: Adjust to a Justifiable Time.** Dealers in our survey on shop rates seem a little shy about asking customers to pay for all time worked.

18: **FIEI Works Capitol Hill.** Members of the industry group made political contacts part of their Spring Marketing & Management Conference in Washington, D.C.

31: **Conventions, Meetings and Shows.** The annual I&T compilation of major farm shows, trade events and other happenings. This is a definite keeper for people who plan.

DEPARTMENTS

I&T Update 4
Editor's Notebook 6
Auction Prices 22
New Literature 27
Industry in Motion 50
What's New 27
Brown Pages 45
Classified Ads 50
Index to Advertisers 50
Advertisers 58

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I&T Update

May Retail Sales: Pluses and Minuses

Retail sales of farm equipment in the U.S. showed some improvements in May over the same month in 1984, according to the flash report of the Farm & Industrial Equipment Institute, but others—particularly tractors over 100 hp—were continuing their downward path.

Pickups were noted in tractors under 100 hp, in combines, conventional balers, forage harvesters and mower-conditioners. For the first five months, only tractors under 40 hp and mower-conditioners are ahead.

	Unit Retail Sales					
	May			January-May		
	1985	1984	Pct. Change	1985	1984	Pct. Change
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	7,403	6,559	+12.9	24,109	21,753	+10.8
40-99 hp	3,918	3,557	+10.1	15,882	17,254	- 8.0
100-139 hp	729	879	−17.1	3,992	4,598	- 13.2
Over 140 hp	866	1,169	−25.9	4,955	6,508	- 23.9
Total 2-wheel drive	**12,916**	**12,164**	**+ 6.2**	**48,938**	**50,113**	**- 2.3**
4-wheel drive						
Under 200 hp	93	169	−45.0	396	810	- 51.1
Over 200 hp	168	244	−31.1	742	1,275	- 41.8
Total 4-wheel drive	**261**	**413**	**−36.8**	**1,138**	**2,085**	**- 45.4**
Total All Tractors	**13,177**	**12,577**	**+ 4.8**	**50,076**	**52,198**	**- 4.1**
S-P Combines	481	439	+ 9.6	1,917	2,906	- 34.0
Balers (under 200-lb. bales)	910	698	+30.4	2,314	2,338	- 1.0
Forage Harvesters (shear-bar type)	198	187	+ 5.9	621	703	- 11.7
Mower-Conditioners	1,744	1,326	+31.5	4,320	4,036	+ 7.0

Case Buys IH Units in Europe

In May, J I Case Co. exercised its option to buy International Harvester Co. operations in Europe. These include works at St. Dizier (tractors), Croix (tractors) and Angers (combines) in France, and Neuss (engines) in West Germany, plus the Danish marketing organization.

Before the Case-IH merger earlier this year, Case had a factory at Meltham, U.K., making six tractors from 43 to 95 hp; in the merger, Case acquired IH's Doncaster factory, which makes seven models from 35 to 72 hp. The number of models has been reduced from 13 to six.

Case-IH's current tractor offering for Europe is made up of seven families with 25 different models. A three-year process of consolidation will leave three families with a total of eight models in the 40 to 140 hp range.

At the time of the consolidation, there were 872 IH and 377 J I Case retail outlets in Europe. The intent is to have a network of 991 outlets.

WFE Stays Alive As Creditors Dicker

The ailing White Farm Equipment Co. remained in operation in late June as creditors prepared for bankruptcy hearings and Borg Warner Acceptance Corp., the major creditor, once again prepared to auction off the firm's assets.

Robert L. Terry, general operating manager of WFE, said the various bankruptcy cases had been consolidated in the federal courts in Chicago.

Faced with involuntary Chapter 7 (liquidation) bankruptcy filings, WFE received court permission to file for Chapter 11 (reorganization). The start of court hearings awaited organization of a creditors' committee.

Terry said BWAC, which wants $148 million from WFE-U.S. and $66 million from White Farm Mfg. Canada, Ltd., has re-scheduled an auction of the U.S. assets for July 24.

"An auction would actually be helpful to set some value on the assets," Terry said. "In the meantime, we're operating as well as we can under an order from the court."

In Canada, Terry said, delicate maneuverings continue among BWAC, Bill Sinclair (White's Canadian owner) the government and Massey-Ferguson, which might pick up some of White's assets or patents.

MF: Modest Profit Despite Combine Losses

In the first quarter of its current fiscal year, ended April 30, Massey-Ferguson Ltd. posted a profit of $400,000 sales of $306 million. In the same period a year ago, earnings were $2.4 million on sales of $365 million.

This year's first period included a loss of $2.9 million on currency fluctuations, compared with a currency profit of $100,000 a year earlier.

Victor Rice, MF chairman, said that farm tractors, diesel engines and industrial machinery lines were profitable, but that combines lost $10 million due to a steep sales decline.

Inventories as of April 30 were reported to be $240 million lower than a year earlier.

Long Mfg. Files Under Chapter 11

Long Mfg. N.C., Inc., filed on June 13 for Chapter 11 bankruptcy court protection from creditors. The company finish-assembles and markets a line of Romanian tractors and builds various farm machines and structures.

The petition, filed at the Wilson, N.C., federal court, could give Long 120 days to develop a reorganization plan. J. Larkin Pahl, attorney for the firm, said it would be "business as usual" for a while, except that pre-filing debts would go unpaid for a time.

Long filed the Chapter 11 petition two days after a petition for involuntary Chapter 7 (liquidation) bankruptcy was filed against the company by four creditors, including two banks and two insurance companies.

Pahl said the four were from a group of nine major creditors to whom Long Mfg. owes about $9 million. There is also, he said, a "trade debt" of $8 million to $9 million owed to suppliers, including the Romanian company that supplies the tractors.

Against those debts, he said, Long as a going concern shows a balance-sheet value of about $30 million.

Briefly....

The Case/IH dealer network in the United Kingdom stands about 200 dealers, according to Agricultural Machinery Journal. Each company had approximately 160 dealers before the acquisition by Tenneco, Case's parent, of International Harvester's farm equipment business. Some dealerships among the 120 not offered the newly integrated line have been given subdealer status.

Dallas G. Lien, engineering vice-president for Steiger Tractor Co., has been named acting chief executive officer. The company is searching for a successor to David Koentopf, who has resigned as president and chief executive officer. A permanent president is expected to be named in mid-August.

I&T
SINCE 1886

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

JONES FARM EQUIPMENT CO.
Dothan, Alabama
May 14, 1985

CASE TRACTOR

430, 1963 (Rough)	450

MASSEY-FERGUSON TRACTORS

590 diesel, (Fair)	3250*
275 diesel, 1977 (Good)	4650
230 diesel, 1979 (Excellent)	4000*
175 diesel, 1968 (Good)	3650
165 diesel, 1971 (Fair)	2650
165 diesel, 1968 (Fair)	2800*
165 diesel, 1966 (Rough)	1350*
165 diesel, 1966 (Fair)	2600*
135 diesel, 1973 (Excellent)	4300*
135 diesel, 1972 (Excellent)	4400*
135 diesel, 1971 (Fair)	1800
135 diesel, 1968 (Good)	2800*
135 diesel, 1967 (Good)	2600*
135 diesel, 1966 (Fair)	2100*
65, LP, 1961 (Fair)	1150*
85 diesel, 1960 (Fair)	1450*
65 diesel, 1959 (Rough)	650
64, 1960 (Good)	1400*
35 diesel, 1963 (Rough)	1125
35 diesel, 1961 (Fair)	1500
35, 1958 (Good)	1750

FORD-FERGUSON TRACTORS

9N, 1946 (Good)	1100
9N, 1943 (Rough)	525*

FORD TRACTORS

TW20 diesel, 1979 (Good)	10,750*
7600 diesel, 1977 (Fair)	4650*
6600 diesel, 1976 (Good)	4750
6600 diesel, 1975 (Fair)	3600
6600 diesel, 1975 (Good)	4000*
4000 diesel, 1972 (Excellent)	4100*
4000, Select-O-Speed, 1966 (Fair)	1800*
4000 diesel, cracked block, 1966 (Rough)	1250*
3600 diesel, 1975 (Fair)	3500
3000 diesel, 1967 (Fair)	2800
3000 diesel, 1967 (Fair)	2700
3000 diesel, 1966 (Fair)	2500
3000 diesel, 1966 (Fair)	2200
3000 diesel, 1965 (Fair)	2500
2810 diesel, (Excellent)	8000*
2810 diesel, (Excellent)	8300*
961 diesel, 1959 (Fair)	925
850, 1955 (Good)	1800*
650, 1955 (Rough)	600
641, 1958 (Good)	1800
NAA, 1954 (Fair)	1050
8N, 1952 (Excellent)	1700*
8N, 1951 (Good)	1450
8N, 1951 (Rough)	650
8N, 1948 (Fair)	1025
8N, 1948 (Rough)	725
8N, 1948 (Fair)	850
8N, 1948 (Rough)	725

INTERNATIONAL HARVESTER TRACTORS

1486 diesel, cab, duals, 1976 (Fair)	6100*
584 diesel, 1978 (Good)	4700
674 diesel, 1975 (Good)	4200
674 diesel, 1975 (Fair)	3400
674 diesel, 1974 (Fair)	3300
666 diesel, 1974 (Fair)	2700*
454 diesel, 1971 (Good)	2950
424 diesel, 1967 (Good)	1700*
364 diesel, 1976 (Rough)	1325
Cub LoBoy, 1956 (Rough)	485
Cub, cult., plt., plow, 1949 (Rough)	675
Cub, cult., mo., plow, 1948 (Rough)	675

JOHN DEERE TRACTORS

4620 diesel, 1972 (Good)	5000*
4020 diesel, 1968 (Good)	3950*
2040 diesel, 1977 (Good)	5200
1020 diesel, 1966 (Good)	2750*
820 diesel, 1970 (Good)	1800

LONG TRACTOR

310 diesel, (Good)	3750*

YODER & FREY, INC.
Archbold, Ohio
May 13, 1985

JOHN DEERE TRACTORS

A, 1944 (Rough)	500*
G, 1949 (Fair)	780
50, 1954 (Fair)	775
520, 1958 (Rough)	800
520, 1957 (Fair)	1650*
60, 1953 (Fair)	850
70,	1000
730, 1958 (Fair)	2000*
730 diesel, 1959 (Fair)	1350
2010 diesel, 1961 (Rough)	975
2020, 1971 (Good)	4275
2030 1974 (Fair)	5250
2030, 1973 (Fair)	4000*
3010 diesel, 1962 (Rough)	2850
3010,	1625
3020, 1965 (Fair)	4500
3020, 1966 (Fair)	3500*
3020, 1965 (Fair)	3400*
4010 diesel, 1963 (Fair)	3450*
4010 diesel, 1963 (Fair)	2550
4020 diesel, 1966 (Fair)	4800*
4020, 1968 (Rough)	3400*
4020, 1966 (Fair)	4200
4020 diesel, 1967	5900
4020, 1968 (Fair)	3900
4020 diesel, 1966 (Good)	4050
4230, 1974 (Good)	8000*
4430, 1975 (Good)	9300
4430, 1974 (Good)	10,250*
4520, 1971 (Good)	6250
4620, 1972 (Good)	5250

ALLIS-CHALMERS TRACTORS

B, 1945 (Rough)	475
B, (Rough)	400
C, 1949 (Fair)	500
C, 1950 (Fair)	325
G,	1200
WC, 1941 (Rough)	300
WD,	800
D-10, 1965 (Fair)	1375
D-14, 1959 (Rough)	825*
D-17, 1961 (Rough)	750*
D-17, 1959 (Fair)	875
D-19, 1960 (Fair)	1175
D-21,	3950
190, 1970 (Fair)	3200*
190XT, 1964 (Rough)	3050
200, 1970 (Good)	4750*
210, 1971 (Good)	4750
7030, 1976 (Fair)	5500*

DEUTZ TRACTOR

D-13006, (Fair)	4300

DAVID BROWN TRACTORS

990 diesel, 1967 (Fair)	2250

FERGUSON & MASSEY-FERGUSON TRACTORS

TE-30, 1946 (Fair)	925*
30, 1950 (Fair)	1200
65, 1962 (Rough)	1700*
65, 1961 (Fair)	2800*
65, 1962 (Fair)	2275*
65, 1962 (Rough)	1700*
285 diesel, 1979 (Fair)	9000*
275, 1980 (Fair)	4700
1080 diesel, 1972 (Fair)	4400
1085, 1976 (Good)	5400
1100, 1968 (Fair)	2300
1100, 1969 (Rough)	1700*
1135, 1975 (Good)	6200

FORD TRACTORS

8N,	950
8N, 1946 (Rough)	900
8N, 1950 (Rough)	1000*
8N, 1948 (Rough)	925
8N,	950
9N,	740
9N, 1943 (Rough)	525
9N, 1943 (Fair)	650*
9N, 1944 (Fair)	750
9N, 1941 (Fair)	675
800, 1958 (Fair)	2400
900, 1957 (Fair)	1825*
601, 1957 (Fair)	1900
801, 1957 (Fair)	1850*
2000 diesel, 1966 (Fair)	2200*
2000, 1970 (Good)	3000
3000 diesel, 1965 (Fair)	2400
3000, 1972 (Good)	4800*
4000 diesel, 1965 (Rough)	3000*
5000 diesel, 1967 (Rough)	3800
5000, 1973 (Fair)	4500*
5000, 1972 (Rough)	4200*
7000 diesel, 1972 (Good)	5800*
8600, 1974 (Fair)	4700*
9000 diesel, 1971 (Fair)	4250*
9600 diesel, 1975 (Fair)	7100
9600, 1976 (Good)	5500*
9600, 1976 (Good)	6500
Jub.,	1500
Jub., 1954 (Fair)	1650*
9700 diesel, 1975 (Fair)	10,200*
860, 1952 (Fair)	2250*

MASSEY-HARRIS TRACTORS

30, 1945 (Fair)	210
44 diesel, 1951 (Rough)	810*

INTERNATIONAL HARVESTER TRACTORS

100, 1955 (Fair)	1650*
Sup. C, 1953 (Fair)	775*
Sup. C, 1950 (Fair)	585
Sup. C, 1951 (Fair)	700
C, 1947 (Rough)	500*
C, 1949 (Fair)	640
A, 1940 (Good)	450
A, 1949 (Rough)	500
A, 1945 (Fair)	1250*
A, 1959 (Good)	1025
Cub, 1949 (Rough)	1150*
Cub, 1958 (Fair)	1150*
Cub, 1957 (Fair)	825
Cub, 1954 (Fair)	1100*
Cub, 1955 (Fair)	775*
Cub, 1956 (Fair)	775*
Cub Lo-Boy, (Fair)	1525
154 Lo-Boy, (Fair)	2050
154 Lo-Boy, 1971 (Fair)	2125*
H, 1947 (Fair)	600*
Sup. H., 1945 (Fair)	475
M,	580
Sup. M, 1952 (Fair)	900
140, 1959 (Fair)	2000
300, 1955 (Rough)	650*
300,	1650
300, 1957 (Fair)	1350
400 diesel, 1957 (Rough)	680*
400, 1956 (Fair)	1275
454 diesel, 1970 (Rough)	3000*
460, 1961 (Rough)	600*
480, 1960 (Rough)	1700*
460 diesel, 1960 (Rough)	1175
504, 1966 (Good)	4150
560, 1960 (Fair)	1125*
560, 1961 (Good)	1750*
Sup. A, 1951 (Rough)	1200
686, 1975 (Excellent)	5400*
706 diesel, 1964 (Fair)	2500*
706, 1964 (Fair)	2300
706, 1963 (Fair)	3100*
766 diesel, 1973 (Good)	7800*
806 diesel, 1965 (Rough)	2600*
806, 1965 (Fair)	2700
826, 1970 (Good)	4800*
856, 1970 (Good)	5750*
966, 1973 (Fair)	6000*
966, 1975 (Rough)	3800*
966, 1977 (Good)	10,200*
1066, 1972 (Fair)	5400*
1066, 1974 (Good)	7700*
1066,	8500
1066, 1976 (Good)	6500*
1586, 1976 (Good)	13,000*
1586, 1977 (Good)	13,300*
3588 diesel, (Rough)	8800

WHITE TRACTOR

4-150, 1974 (Rough)	7500

OLIVER TRACTORS

60, 1945 (Rough)	275
77, (Fair)	320*
88 diesel, 1954 (Good)	675
88 diesel,	280
770, 1958 (Fair)	1100*
880, 1963 (Good)	1475
1550, 1967 (Fair)	2850*
1650, 1965 (Good)	3400
1650, 1966 (Fair)	3495*
1650 diesel, 1965 (Fair)	2100*
1650 diesel, 1968 (Good)	2700
1950-T diesel, 1964 (Rough)	2800
1955, 1973 (Fair)	5000*
Sup. 77 diesel, 1953 (Fair)	800*

CASE TRACTORS

830, 1964 (Fair)	1700*
1070, 1972 (Fair)	5900*
1170, 1970 (Good)	5000*
1175, 1974 (Rough)	4000*
1370, 1976 (Good)	5250
2390, 1981 (Excellent)	11,500*
2470, (Fair)	7400*

COCKSHUTT TRACTORS

40,	500
560,	580
1750 diesel, 1967 (Good)	2200

MINNEAPOLIS-MOLINE TRACTORS

U, 1948 (Fair)	325

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TWO DOLLARS

Implement &Tractor

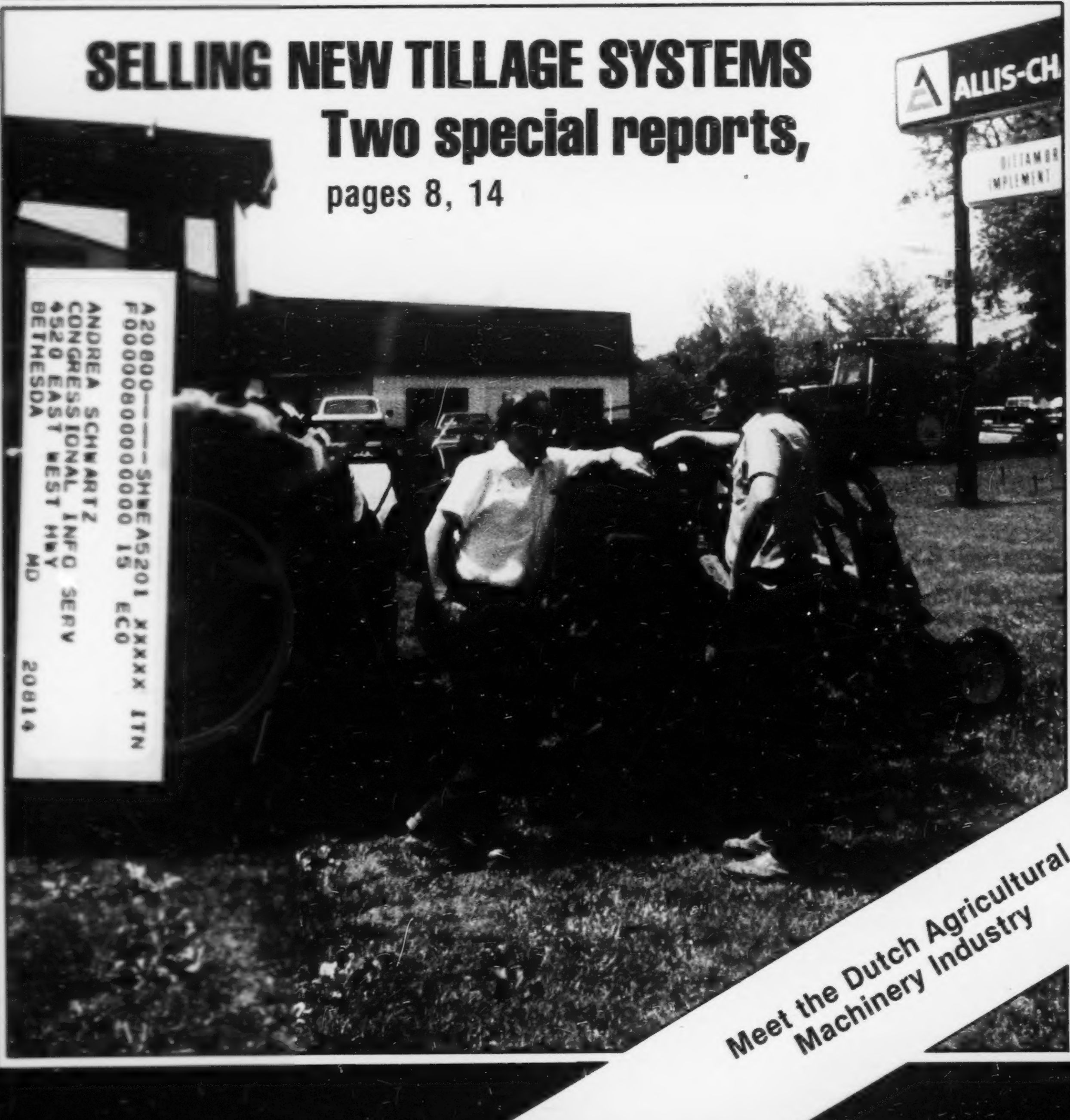
The business magazine of the farm and industrial equipment industry

AUGUST 1985

What's Happening in Louisville? page 16

SELLING NEW TILLAGE SYSTEMS

Two special reports, pages 8, 14



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page 8

8: Selling Tillage Systems: The New Ideas Require the Old Basics. Two Illinois dealerships are putting over fresh soil-preparation concepts. If you want to get the farmer to change his way of doing things—and buy a machine—you prove the benefits.

14: No-till Seeding in Virginia: Public Demonstration Pays Off. Thanks to the efforts of a county agent, farmers got the word and local dealers made a lot of sales. Could it be done elsewhere?

16: A First For America: Agri-Tech in Louisville. An internationally oriented trade exposition for this industry takes its first bows Sept. 11-14 at the Kentucky Fair & Exposition Center, and NFPEDA meets in the same town. Seminars will explore electronics on farm machines, and the industry's global character.

26: FDO Survey Report: Where the Training Dollars Go. The monthly I&T survey finds out where dealers invest in-service education money and time.

On the cover... Bill Dittamore and son Kent contemplate one of the reduced-tillage devices they have been selling lately in the territory around Teutopolis, Ill.

DEPARTMENTS

I&T Update 4
Editor's Notebook 6
Auction Prices 22
New Literature 28
What's New 30
Industry in Motion 41
Brown Pages 45
Classified Ads 50
Index to
Advertisers 50

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I&T Update

Retail Sales Soft in June Except Under-100-HP Tractors

While unit retail sales totals for the first six months of 1985 show tractor volume in the U.S. holding even with 1984, the strength is concentrated in the under-40 and 40-99 horsepower groups, according to the flash report of the Farm & Industrial Equipment Institute.

	Unit Retail Sales					
	June			January-June		
	1985	1984	Pct. Change	1985	1984	Pct. Change
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	8,977	6,794	+32.1	33,267	28,547	+16.5
40-99 hp	5,067	4,309	+17.6	20,935	21,563	− 2.9
100-139 hp	791	981	−19.4	4,785	5,579	−14.2
Over 140 hp	849	1,058	−19.8	5,801	7,566	−23.3
Total 2-wheel drive	**15,684**	**13,142**	**+19.3**	**64,788**	**63,255**	**+ 2.4**
4-wheel drive						
Under 200 hp	91	155	−41.3	488	965	−49.4
Over 200 hp	178	280	−36.4	920	1,555	−40.8
Total 4-wheel drive	**269**	**435**	**−38.2**	**1,408**	**2,520**	**−44.1**
Total All Tractors	**15,953**	**13,577**	**+17.5**	**66,196**	**65,775**	**+ 0.6**
S-P Combines	477	497	− 4.0	2,386	3,403	−29.9
Balers (under 200-lb. bales)	1,443	1,527	− 5.5	3,755	3,865	− 2.8
Forage Harvesters (shear-bar type)	276	372	−25.8	897	1,075	−16.6
Mower-Conditioners	2,325	2,901	−19.9	6,247	6,937	− 9.9

Canada: Improvement In Most Tractor Sales Groups

Through June, retail sales of new tractors in Canada are up 5.5 per cent on 1984's first half at 10,458 units. As expected, sales of under-40-hp tractors are up 12 per cent to 2,172 units; surprisingly, two-wheel-drive tractors over 100 hp are up 13.4 per cent on the year. Only four-wheel-drive tractors are down—by 13 per cent to 1,279 units.

Mower-conditioner sales for the first six months of 1985 were exactly even with the same 1984 period at 847 units. Conventional balers were down 7 per cent at 648 units; larger baler sales were up 13 per cent to 641 units. Self-propelled combines declined in volume for the period by 29 per cent to 162 units. Pull-type combines dropped 13 per cent to 513.

Pull-type swathers increased 35 per cent in volume to 302 units but self-propelled versions declined by 15 per cent to 388 units.

Massey Absorbs White's Axial Combines While Bankruptcy Case Lingers On

Mired in bankruptcy court in Chicago, officials of White Farm Equipment Co. watched in frustration last month as Massey-Ferguson bought White's axial-flow combine line from a Canadian receiver.

The purchase created yet another obstacle for White executives who are developing a Chapter 11 reorganization plan while seeking someone to buy the ailing farm machinery builder and satisfy $148 million in loan-repayment demands of Borg Warner Acceptance Corp. and the demands of other creditors.

Massey, for an undisclosed sum, bought the design, tooling and manufacturing rights, along with all existing stocks of unsold combines, from Peat Marwick Ltd., the receiver appointed by BWAC to administer White's sister company, White Farm Mfg. Canada Ltd., which owed BWAC $66 million.

Another disappointment for White officials was the lack of sizeable bids for the company's operating units when an auction authorized by the bankruptcy court was held on July 24.

Robert L. Terry, general operating manager of White, said the only acceptable bid was $2 million for the lift truck operation, from Consolidated International of Columbus, Ohio. Consolidated is best known for having liquidated the remaining stock of DeLorean motor cars.

Final approval of bids for White's operating units must come from John D. Schwartz, the bankruptcy judge, but Terry said he believes all other bids would be rejected as being too low.

"It certainly can't help to have the axials go to Massey," Terry said, "but they weren't the majority of our combine sales, and they're not the only thing we have going. I'm still optimistic that we'll find a way to continue on under the White name."

One potential savior of the White name is Allied Products Corp., which owns Bush Hog and several other short-line manufacturers. Charles Lunger, executive vice-president of Allied, would only comment that Allied is "still reviewing the matter."

Meanwhile, the White dealer organization was being wooed by competitors.

Massey, through the combine deal, got a foot in the door of White dealerships that had unsold combines financed or floor planned through BWAC. Massey said it plans "an orderly marketing of the product through selected Massey-Ferguson and White dealers."

The unsold combines include models 9700 and 9720, the largest capacity machines on the market and the first axials to be offered through Massey, who had made only conventional combines.

Shortly after taking over the White units, Massey finished assembling four of the model 9320 White combines that had been unveiled in January. If tests on that mid-sized axial are successful, the 9320 will likely join the Massey line in the near future.

Massey's deal also included the White engineering center at Brantford, Ont., where Massey will consolidate its engineering facilities from Toronto and Milliken, Ont. Left on the drawing boards at Brantford were plans for a new pull-behind axial combine, the White 9350.

"There is no iron built on that model, and there's no shortage of pull-behinds right now, but we consider that an important market," said a Massey executive.

A marketing source said several White dealers have been "receptive" to Massey's overtures, though he would not release numbers of new dealers signed.

A source at Ford said at least four White dealers had taken on that blue line, and said Ford was making particular efforts to pick up White dealers, and disaffected or disowned Case and IH dealers, particularly in Midwestern states from Ohio to Iowa.

Insiders at newly formed Deutz-Allis say recruitment efforts are "sort of on hold" while the merger is put

(Continued on page 44)

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

YODER & FREY, INC.
Archbold, Ohio
June 11, 1985

INTERNATIONAL HARVESTER TRACTORS

100, 1956 (Fair)	1400*
A, 1947 (Fair)	1200*
A, 1951 (Fair)	650*
A, 1947 (Rough)	650*
Cub, 1950 (Fair)	650*
Cub, 1951 (Fair)	1475
Cub, 1952 (Fair)	1150*
154 Lo-Boy, 1972 (Fair)	2200
H, 1947 (Fair)	575*
H, 1950 (Rough)	750*
M, 1953 (Rough)	1225
M, 1950 (Fair)	800*
Sup. C, 1953 (Fair)	700*
300, 1955 (Fair)	800*
300, 1957 (Fair)	700*
300, 1956 (Fair)	1925*
444, 1968 (Fair)	2000
400, 1955 (Rough)	700*
504 diesel, 1966 (Good)	1450
560, 1960 (Fair)	2000
660, 1960 (Fair)	1400*
660, 1959 (Rough)	950*
656, 1968 (Good)	2950
656, 1970 (Good)	3800
70, 1974 (Fair)	4000
686, 1975 (Good)	5550
706, 1966 (Fair)	2900
706, 1966 (Fair)	2800*
756, 1967 (Fair)	3000*
806 diesel, 1965 (Fair)	2850*
826, 1970 (Fair)	4250*
856, 1970 (Fair)	5250*
856, 1969 (Fair)	5000*
966, 1974 (Fair)	5250*
1456, 1970 (Fair)	4750
1466, 1973 (Good)	6700*
1568, 1972 (Fair)	5500*
1568, 1974 (Good)	4600*
1986, 1978 (Good)	9500*
1986, 1977 (Good)	11,000*

COCKSHUTT TRACTORS

E-3,	300
560, 1959 (Rough)	550

DAVID BROWN TRACTORS

880, 1964 (Fair)	925
1200, 1967 (Rough)	1900
1212, 1974 (Good)	4000

FORD TRACTORS

8N, 1950 (Rough)	850*
8N, 1952 (Fair)	1425
8N, 1951 (Fair)	1350*
9N, 1941 (Fair)	1350
900, 1957 (Fair)	1450*
2000 diesel, 1965 (Rough)	2000
2000, 1964 (Good)	2250*
8600, 1975 (Fair)	4700
8600, 1975 (Good)	4500*
9600, 1976 (Fair)	5500*
Jub., 1954 (Fair)	1875
Jub., 1954 (Fair)	1950*
Jub., 1953 (Rough)	1600
Jub., 1954 (Fair)	1875
9700,	10,250
9700, 1980 (Good)	12,000
Maj. diesel, (Rough)	950

OLIVER TRACTORS

88 diesel, 1952 (Rough)	750
66, 1950 (Fair)	725
1550, 1965 (Fair)	2600*
2150, (Fair)	4000
55 diesel, (Rough)	850*

MINNEAPOLIS-MOLINE TRACTOR

Z,	225

JOHN DEERE TRACTORS

B,	315
B, 1949 (Fair)	625
50, 1955 (Good)	1200
H, 1952 (Fair)	525*
60, 1954 (Rough)	700*
720 diesel, 1958 (Fair)	1800*
730 diesel, 1958 (Fair)	1300*
730 diesel, 1958 (Fair)	1250*
730, 1960 (Fair)	2500*
2010, 1962 (Fair)	1750
2020, 1972 (Fair)	3700*
4020, 1964 (Rough)	3700
4020, 1967 (Fair)	2050*
4020, 1965 (Rough)	3300*
4430, 1976 (Fair)	9000*
5020, 1969 (Rough)	3250*
5020, 1970 (Fair)	4600*
7520, 1968 (Fair)	9250*

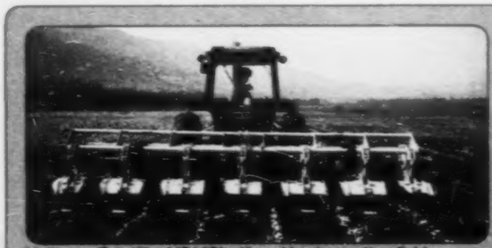
ALLIS-CHALMERS TRACTORS

B, 1948 (Rough)	530
C, 1949 (Fair)	575
WD-45, 1951 (Rough)	435*
WD-45, 1956 (Fair)	825
D-14, 1965 (Rough)	550*
190XT, 1970	2700
190XT, 1970 (Rough)	2900
220 diesel, 1971	5750*

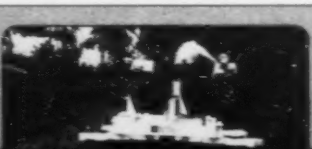
CASE TRACTORS

300, 1955 (Rough)	950
730, 1967 (Rough)	1800*
730, 1967 (Rough)	2300*
830, 1964 (Rough)	950*
830 diesel, 1964 (Rough)	1600*
1070, 1974 (Fair)	5400*
1175, (Rough)	3000*

(More...)

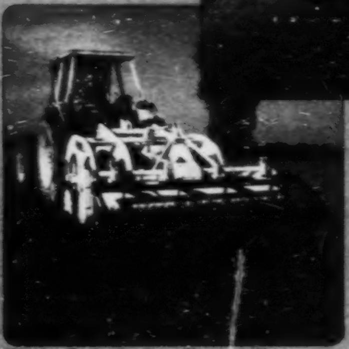


Multi-row Rototiller MG/ "Giant" working in a cotton field.

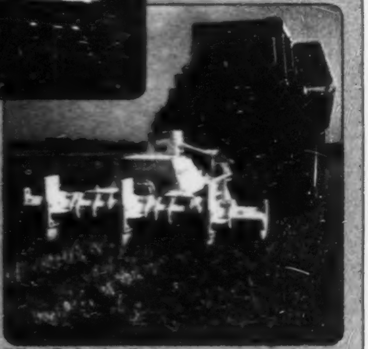


Disc Harrow working in an orchard.

Rolling Cultivator working in a soybean field.



"Dumbo-Ter" subsoiler with rotary tiller.



"Vibra-Ter" subsoiler.

Some views of workshops in Badalini factory.

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Auctions *(continued)*

1470 TK, (Rough)	5300*
2390, 1979 (Good)	12,000*
SC,	170

FERGUSON & MASSEY-FERGUSON TRACTORS

20,	500
65 diesel, 1959 (Rough)	1800*
65, 1961 (Rough)	1750*
65, 1962 (Rough)	1700*
65, 1965 (Rough)	1600*
65, 1960 (Fair)	2300*
135, 1970 (Fair)	4000*
165 diesel, 1969 (Good)	3500
265 diesel, 1979 (Good)	4750*
275, 1980 (Good)	6250*
1100, 1969 (Rough)	1750
1130, 1970 (Fair)	3100*
1150 diesel, 1970 (Rough)	3800*
2135,	1300

JONES FARM EQUIPMENT, INC.
Dothan, Alabama
June 11, 1985

ALLIS-CHALMERS TRACTOR

C, 1951 (Rough)	300

CASE TRACTORS

2470 diesel, cab, 1973 (Good)	8500*
1370 diesel, 1972 (Excellent)	8500*

DAVID BROWN TRACTOR

1200 diesel, 1967 (Fair)	1000*

MASSEY-FERGUSON TRACTORS

1105 diesel, 1973 (Good)	4425*
1100 diesel, 1966 (Rough)	2000
590 diesel, (Fair)	2900*
590 diesel, (Fair)	3300*
245 diesel, 1978 (Good)	4300*
235 diesel, 1975 (Good)	3550
180 diesel, 1967 (Rough)	2100*
175 diesel, 1968 (Good)	2825*
175 diesel, 1967 (Rough)	1750
165 diesel, 1965 (Good)	3000
135 diesel, 1972 (Fair)	2450
135 diesel, 1970 (Fair)	2350
135 diesel, 1970 (Fair)	2600
135 diesel, 1966 (Good)	2800*
65 diesel, 1962 (Rough)	2200*
65 diesel, 1960 (Good)	1700
35, 1960 (Good)	1700
35, 1960 (Good)	2000*
35, 1960 (Good)	1250
35, 1958 (Good)	1650
35 diesel, 1958 (Fair)	1000
35, 1956 (Fair)	925
TO20, 1948 (Rough)	650*

FORD-FERGUSON TRACTORS

9N, 1947 (Excellent)	1500*
9N, 1944 (Fair)	600

FORD TRACTORS

9000 diesel, canopy, 1972 (Fair)	3700
6610 diesel, 1984 (Excellent)	12,500*
6600 diesel, cab, 1977 (Excellent)	5500*
6600 diesel, canopy, 1976 (Good)	4500*
6600 diesel, cab, 1976 (Good)	4800*
6600 diesel, canopy, 1975 (Fair)	3600*
6600 diesel, 1975 (Good)	3950
5000 diesel, 1974 (Good)	4500
5000 diesel, 1968 (Fair)	3400*
5000 diesel, 1968 (Fair)	3400*
4600 diesel, 1976 (Fair)	4000*
4000 diesel, 1972 (Fair)	3300*
4000 diesel, 1969 (Fair)	3200
4000 diesel, 1968 (Fair)	2800
4000 diesel, 1968 (Fair)	2850
4000 diesel, 1968 (Rough)	2425
4000 diesel, 1967 (Rough)	2500*
4000 diesel, 1966 (Rough)	2200*
4000 diesel, 1966 (Rough)	1700*
3000 diesel, 1970 (Good)	3200
3000 diesel, 1970 (Good)	2900*
3000 diesel, 1970 (Good)	3100
3000 diesel, 1969 (Good)	3000
3000 diesel, 1969 (Good)	3050
3000 diesel, 1968 (Good)	2900
3000 diesel, 1967 (Good)	2800*
3000 diesel, 1966 (Rough)	2300
3000 diesel, 1966 (Fair)	2650*
3000 diesel, 1966 (Rough)	2250
3000 diesel, 1966 (Fair)	2400*
3000 diesel, 1966 (Rough)	2150
2000 diesel, 1966 (Fair)	2400*
2000 diesel, 1966 (Fair)	2500*
2000 diesel, 1966 (Fair)	2250
2000 diesel, 1966 (Fair)	2500*
850, 1956 (Rough)	1050
641, 1960 (Good)	1650
640, 1956 (Fair)	1300*
640, 1955 (Rough)	850
Jub., 1953 (Rough)	725
Jub., 1953 (Fair)	1100*
8N, 1952 (Good)	1600*
8N, 1950 (Good)	1400*
8N, 1950 (Fair)	875*
8N, 1948 (Rough)	700*
8N, 1948 (Good)	1425
8N, 1948 (Fair)	825*
8N, 1948 (Good)	1300
8N, 1948 (Fair)	800
8N, 1948 (Fair)	900*
8N, 1948 (Fair)	950
8N, 1948 (Fair)	900
8N, 1948 (Good)	1300*

INTERNATIONAL HARVESTER TRACTORS

3588 diesel, 1979 (Good)	8000
674 diesel, 1974 (Fair)	3600
574 diesel, cab, 1976 (Fair)	3400*
574 diesel, 1975 (Fair)	3150*
454 diesel, 1971 (Fair)	2450
454 diesel, canopy, 1971 (Fair)	2600*
454 diesel, 1971 (Good)	3375*
444 diesel, 1970 (Good)	3300*
444 diesel, 1967 (Rough)	2100*
B414 diesel, 1963 (Fair)	1350*
B414 diesel, 1963 (Good)	2000*
350, 1957 (Good)	1000
B275 diesel, 1959 (Rough)	425
B275 diesel, 1959 (Good)	1125*
140, 1960 (Fair)	950*
Hydro 84 diesel, 1979 (Good)	3500
A Saw, 1946 (Good)	925
A, 1944 (Good)	375

JOHN DEERE TRACTORS

4240 B, cab, 1979 (Excellent)	11,000*
3010 diesel, 1961 (Good)	2950
2440 diesel, 1976 (Good)	5700
2130 diesel, (Fair)	2300*
2120 diesel, (Good)	3200
2040 diesel, 1977 (Good)	4100
2010 diesel, 1961 (Fair)	750
1020 diesel, 1966 (Good)	2800
60, 1953 (Good)	800*
MT, cult., 1952 (Good)	575

LONG TRACTORS

610 diesel, (Good)	2500*
310 diesel, (Excellent)	3900*
310 diesel, (Rough)	200

MINNEAPOLIS-MOLINE TRACTOR

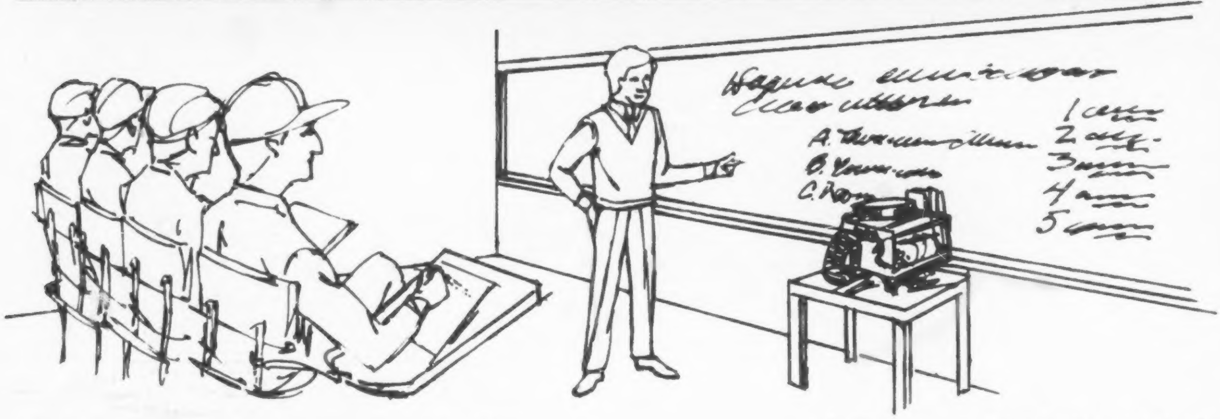
670 diesel, 1966 (Fair)	1600

WHITE TRACTOR

2-150 diesel, duals, 1975 (Fair)	3000*

FDO Survey Report

Where the Training Dollars Go



■WHEN IT'S time to give employees in-service training, dealers spend the most per-person on the sales force, and the least on the service department.

That's the story told by 25 dealers who filled out the For Dealers Only survey in the May issue of I&T

Broken down by dollars spent per person, here's how dealers spent their training funds:

Sales	$514
General Mgr	484
Service Mgr	245
Parts Dept	236
Service Dept	230

But money isn't everything. Looked at from the standpoint of man-days of formal training per person, there's a different order of priorities:

Sales	4.3
General Mgr	4.3
Service Dept	3.6
Service Mgr	3.5
Parts Dept	1.9

The parts department might get the least amount of training, but the survey showed the training cost the most per man-day:

Parts Dept	$126
General Mgr	114
Sales Dept	107
Service Dept	61
Service Mgr	59

The survey didn't gather a lot of detail about specific kinds of training, and it may be that, with the introduction of computer systems for inventory control, the parts people were getting some high-tech education, which could account for the higher cost per day.

It's also likely that factory sponsorship of service schools helped hold down the cost of education for the service department personnel.

What is certain is that each job function tends to get specialized training, with only the general managers receiving a relatively broad spectrum of exposure to product features, technical skills and coursework in sales skills. As the table shows, for example, 100 per cent of service department employees got technical training, while only 5 per cent were exposed to sales skills. I&T

Who Gets What Training?

(Percentage within each job group that got specific types of training)

	Product Features	Sales Skills	Technical Skills
Sales Dept.	90	90	20
Parts Dept.	67	89	44
Service Dept.	23	5	100
Service Mgr.	53	35	88
General Mgr.	69	69	54

Note: Cumulative totals exceed 100 per cent due to multiple training exposures by many individuals.

Join FDO—It's FREE!

The free exchange of ideas and facts is the notion behind our For Dealers Only survey appearing each month inside the front cover of *Implement & Tractor.*

If you find the information from FDO interesting and possibly useful, you can make it even better for yourself by taking part in the survey. The postage is paid and the survey takes just a moment to complete.

And if you have an idea for a topic FDO should cover, jot a note on the survey form. We'd like to hear from you.

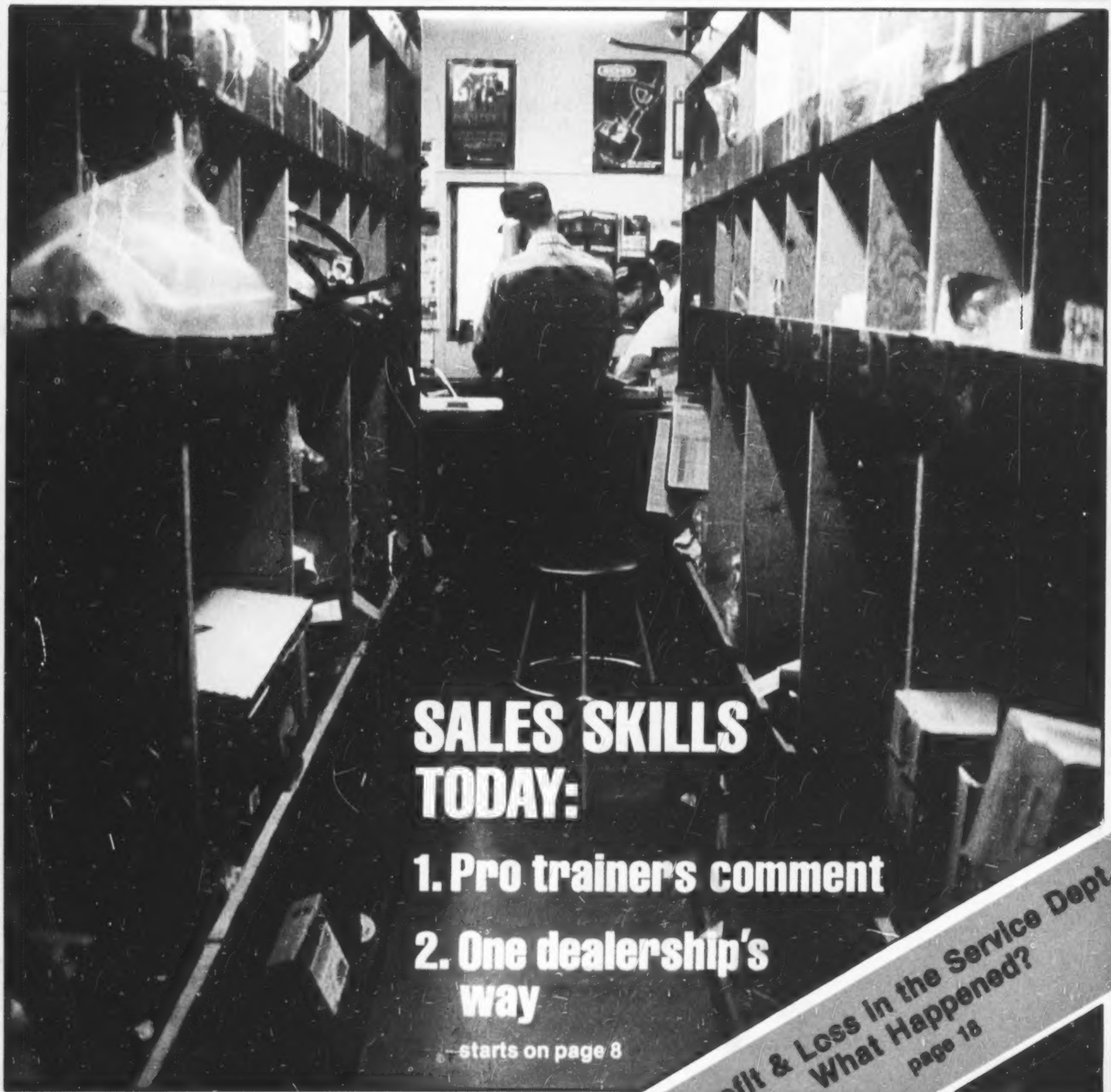
TWO DOLLARS

C4725-1

Implement & Tractor

The business magazine of the farm and industrial equipment industry SEPTEMBER 1985

Who's got the best fuel economy? Part 1, page 22



SALES SKILLS TODAY:

1. Pro trainers comment
2. One dealership's way

—starts on page 8

Profit & Loss in the Service Dept.: What Happened?

page 18

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Implement & Tractor

The business magazine of the farm and industrial equipment industry.

September 1985 • Vol. 100 • No. 11

ECHO
OUTDOOR POWER
EQUIPMENT

page 14

8: Basics of Sales Skills: Does This Industry Lag? I&T takes a canned manuscript by a team of sales training specialists, shows it to farm equipment selling instructors. Verdict: We're keeping up—and many of our retail salesmen are well grounded in effective, modern methods.

14: A Dealer Shows His Methods. Point-by-point, Dealer Richard Straub lays out the guidelines he uses for successful selling.

18: ZAP! Service Department Losses Got Worse in 1984. Agribusiness economist Richard A. Edwards blames low shop rates as key villain. Will we hit a $70,000 loss in 1985?

22: Tractor Fuel Economy Ratings. The horsepower hour per gallon ratings of tractors changes depending on usage. This listing, starting this month and continuing in future issues, brings together the fuel efficiency ratings of all tractors tested from 1980 through 1984 at the Nebraska Tractor Test Lab.

30: Britain's Royal Show Brings Out Ideas. A pictorial tour of some of the more innovative machinery seen at this year's edition of the biggest farm show in the United Kingdom.

On the cover... Richard Straub handles phone calls and customers at the parts counter of his Tri-County Equipment Co., the Deutz/Allis dealership in Poseyville, Ind.

DEPARTMENTS

I&T Update 4
Editor's Notebook 6
Auction Prices 24
Industry in Motion 27
What's New 33
New Literature 44
Brown Pages 45
Classified Ads 50
Index to Advertisers 50

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I&T Update

July Retail Sales: The Slump Continues

While some upturns were seen in retail sales of farm equipment, the July flash report by the Farm & Industrial Equipment Institute showed a continuing slump in the overall market.

Tractor sales were up somewhat compared with July, 1984, although the market was weaker for the 40-100 hp 2WD tractors and for 4WD machines under 200 hp. There was a good percentage increase for 2WDs over 140 hp in the month-to-month comparison, but the year-to-date figures show strength only in 2WD tractors under 40 hp.

Other equipment, including combines, balers, forage harvesters and mower conditioners, were down for both the month and year.

Unit Retail Sales

	July			January-July		
	1985	**1984**	**Pct. Change**	**1985**	**1984**	**Pct. Change**
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	5,014	4,570	+ 9.7	37,551	33,117	+ 13.4
40-99 hp	2,934	3,007	− 2.4	24,575	24,570	.0
100-139 hp	489	428	+ 14.3	5,248	6,007	− 12.6
Over 140 hp	673	517	+ 30.2	6,473	8,083	− 19.9
Total 2-wheel drive	**9,110**	**8,522**	**+ 6.9**	**73,847**	**71,777**	**+ 2.9**
4-wheel drive						
Under 200 hp	41	63	− 34.9	527	1,028	− 48.7
Over 200 hp	105	106	− .9	1,022	1,661	− 38.5
Total 4-wheel drive	**146**	**169**	**− 13.6**	**1,549**	**2,689**	**− 42.4**
Total All Tractors	**9,256**	**8,691**	**+ 6.5**	**75,396**	**74,466**	**+ 1.2**
S-P Combines	572	814	− 29.7	2,958	4,217	− 29.9
Balers (under 200-lb. bales)	1,264	1,879	− 32.7	5,016	5,744	− 12.7
Forage Harvesters (shear-bar type)	173	401	− 56.9	1,070	1,476	− 27.5
Mower-Conditioners	1,659	2,392	− 30.6	7,917	9,329	− 15.1

Canadian Sales Up In Some Categories

Retail sales of farm equipment in Canada showed increases in most farm tractor categories through July, but most implement groups declined in volume.

For the year, two-wheel-drive tractor sales were up 8.6 per cent at 10,394 units. Surprisingly, main strength of the increase was in the 100-hp-plus group, up 16 per cent at 2,938 units. Four-wheel-drive tractors were down 14 per cent for the seven months to 1,373 units.

Self-propelled combine sales were off 12.7 per cent at 702 units. Sales of smaller-type balers were off 13 per cent at 1,064 machines, but large balers were up 9 per cent at 1,189 units.

Industry observers attributed the majority of the large tractor sales increases to intense inventory-reduction efforts.

Deere's 9-Month Sales: $2.9 Billion

In the first nine months of fiscal 1985, ended July 31, Deere & Co. posted an 8 per cent sales decline from $3.2 billion to $2.9 billion. Net income for the three quarters was $11.1 million compared with $70.8 million a year earlier.

In the third quarter, sales were approximately even with those of the same 1984 period at $1 billion. Net income was $4.5 million, down from 1984's $29.4 million.

Trade receivables, largely dealer inventories, were $2.84 billion on July 31 compared with $2.88 billion a year earlier.

Steiger Reports 3rd Quarter Loss

Steiger Tractors, Inc., posted a loss of $1.6 million for the third fiscal quarter ending June 30, 1985. This compares with net income of $96,000 for the same 1984 quarter.

Sales for the first nine fiscal months of 1985 were $66 million, down 31 per cent from $96 million in the same period in 1984.

Dallas Lien, acting chief executive officer, noted North American 4WD sales industrywide were down 36 per cent from the weak levels of a year ago. He blamed excessive inventories and resulting costly sales programs on the part of competitors for Steiger's poor performance.

Ownership Change For Howard Rotavator

Howard Rotavator Co., Inc., U.S. distributors of rotary tillers and the Paraplow, will experience a change of overseas parents, according to Steve Franz, controller of the Muscoda, Wis., company.

Due to financial difficulties, the parent Howard Rotavator of England was placed in receivership. A Danish company, TT Agro, has agreed to buy parts of Howard's UK operations, along with subsidiaries in Italy, Spain, France and Germany.

"We see it as a favorable move," Franz said. "With money from TT Agro, we hope to develop some new product lines."

Alcohol-Burning Tractors for Ford of Brazil, and Illinois

Ford Tractor Operations has started producing an ethanol-powered tractor, the 4810, in Brazil, and has sold eight similar machines to the State of Illinois on an experimental basis for highway maintenance.

The Illinois tractors will be assembled at Romeo, Mich., using Brazilian engine parts. There are no plans to mass-produce or sell the alcohol burners in North America, Ford says.

Based on the Ford 4610, the ethanol engines have a gasoline cold-starting system, and get 62 pto hp against the 52 pto hp of the standard diesel-powered 4610.

Exports, Imports Of Ag Equipment Down in 1st Half

United States exports and imports of farm equipment declined in the first six months of 1985 from the same period in 1984. Exports fell 18 per cent to $982 million; imports were off 7 per cent at $830 million.

Some volume comparisons, 1985 vs. 1984, from among major U.S. equipment customers: Canada, down from $537 million to $425 million; Mexico, up from $40 million to $126 million; Australia, down from $108 million to $69 million; Saudi Arabia, down from $95 million to $53 million; France, down from $51 million to $32 million.

Imports from the U.S.'s two largest farm equipment sources were down: Canada from $301 million to $227 million; Japan from $180 million to $158 million. Volume from the U.K. declined from $119 million to $110 million; from Italy, down from $78 million to $71 million. Imports from West Germany were up from $112 million to $118 million; from France, up $2 million to $36 million.

Service Department Losses Got Worse in 1984

Author Richard A. Edwards blames low shop rates as key villain. Will we hit a $70,000 loss in 1985?

■AFTER substantial improvement in 1983, the shop's financial performance in 1984 was truly disappointing.

Analysis of the 1984 Cost of Doing Business Study, prepared by the National Farm & Power Equipment Dealers Assn., reveals losses attributed to shop operations increased significantly over the previous year. In 1983, the losses were about $47,000. This was a significant improvement, about 30 per cent, from the 1982 loss of about $62,000.

The improved performance of 1983 could be traced to management's ability to make major reductions in overhead expenses and implement programs that increased the shop's gross margin dollars.

Unfortunately, the cost-cutting programs did not have any lasting effects. In 1984, overhead costs soared to their highest level ever. The shop's portion of administrative and general expenses were up 25 per cent. Even continued improvements on the income side of the shop's business could not generate a like number of dollars. The result was a loss for 1984 that was over $65,000.

Before we look at the 1984 negative performance in depth, let's look at positives.

First, the billing efficiency, reflecting the number of hours sold, improved: It increased by 5 per cent from 63 to 68 per cent! This is significant in that one of the major contributing factors to shop losses are extremely low billing efficiencies. This improvement in billing efficiencies is reflected in the shop's sales volume. Volume dollars were up over $20,000 from the previous year with virtually the same number of hours worked. Only about one-half of this increase can be attributed to increases in shop rates.

Second, the gross margin per cent continues to inch upward. Over the past 10 years, this indicator reflecting the amount of sales dollars applied toward the shop's overhead, has increased from less than 30 per cent to the present 42.7 per cent.

Rates too low

Improvements have been made in these two decisive income parameters; but there still is one income issue that dealers are not willing to face. Shop rates are still too low! The CODB data show that the breakeven shop rate is $30.63. The present average shop rate, for those supplying data to the CODB survey, is $22.43.

During the past year, dealers raised their hourly shop rates an average $1.24; but average wages increased 95 cents an hour, and indirect costs went up $3.42 per man-hour; a total increase of $4.37 per hour.

Dealers need to continue their efforts at increasing billing efficiency and gross margin dollars. Yet, they must remember these efforts can take them only so far. Dealers must charge realistic hourly shop rates if they are to have any hope of reversing the shocking trend of shop losses.

Hard to control

The reason I emphasize the importance of the shop's income situation is that there is not much opportunity to control many of the overhead expenses. Most of these expenses are of a highly fixed nature, and, as such, they continue at a constant or slightly increasing level regardless of the level of volume. Examination of these overhead expenses suggests that

(More...)

The author is an agribusiness economist for the Texas Ag Extension Service, College Station, Texas.

THANKS A

Shop Losses

(continued)

most, about 80 per cent, are fixed and relatively insensitive to volume changes. The only way to cover these costs is, to increase volume and subsequent margin dollars.

This can be done only through increasing billing efficiency, increasing the shop rate, or increasing the number of hours for sale. Billing efficiency can be increased, but it does have an upper limit. Increasing the number of hours for sale through increasing the workforce is only viable if dealers can provide enough work.

Increasing shop rates to the necessary level in a short time would not be a wise choice, but recognition of the essence of the problem and instituting a suitable course to achieve this objective does seem to be in order.

If the problem of low shop rates is not properly addressed, it is not beyond the realm of comprehension to expect average shop losses to exceed $70,000 in 1985.

Shop Operation's Financial Data

(Rounded to the nearest $100)

Year	Gross Margin ($)	Overhead Expenses	Net Loss
1976	27,300	71,900	44,600
1977	29,900	78,200	48,300
1978	38,000	86,100	48,100
1979	45,500	104,300	58,800
1980	54,700	114,300	59,600
1981	61,100	128,400	67,300
1982	61,700	123,800	62,100
1983	64,600	111,300	46,700
1984	74,300	139,600	65,300

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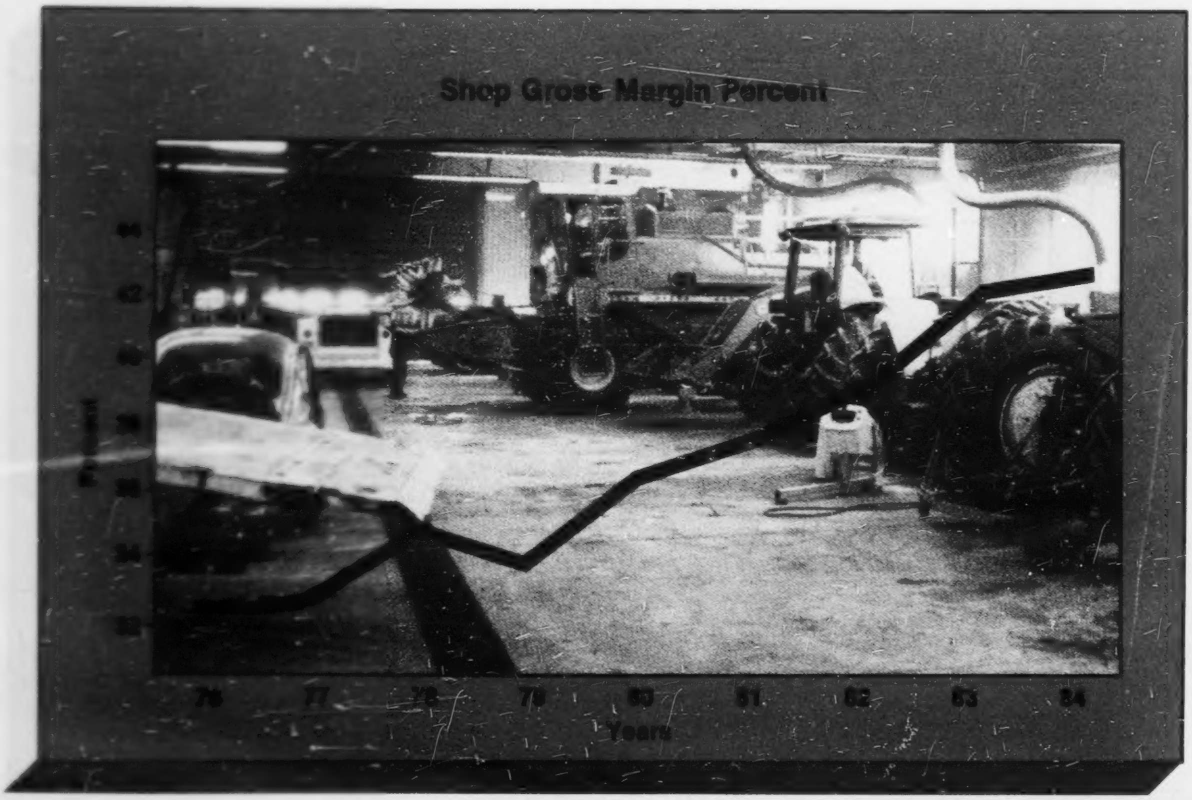

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Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

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Dothan, Alabama
July 9, 1985

ALLIS-CHALMERS TRACTOR

C, cult., 1944 (Fair)	500

DAVID BROWN TRACTORS

1200 diesel, 1967 (Rough)	900
990 diesel, 1964 (Rough)	400

CASE TRACTORS

2470 diesel, cab, 1973 (Fair)	4500*
1370 diesel, 1973 (Good)	9700*

MASSEY-FERGUSON TRACTORS

1105 diesel, 1973 (Good)	3800*
255 diesel, 1978 (Good)	5100*
180 diesel, 1967 (Fair)	2500
175 diesel, 1973 (Fair)	2750*
175 diesel, 1967 (Rough)	1750*
165 diesel, 1968 (Fair)	2600*
165 diesel, 1967 (Fair)	2500*
135 diesel, 1974 (Fair)	2400*
135 diesel, 1973 (Fair)	2300*
135 diesel, 1969 (Rough)	1850
135, 1967 (Fair)	2100*
65 diesel, 1964 (Good)	1700*
65 diesel, 1959 (Rough)	650*
50, 1958 (Good)	1800
35 diesel, 1961 (Good)	2200
35, 1958 (Good)	1700*
35 diesel, 1958 (Fair)	1550*
TO20, 1948 (Fair)	700*

FORD-FERGUSON TRACTOR

9N, 1946 (Good)	1200*

FORD TRACTORS

8600, 1974 (Fair)	4100
6610 diesel, 1984 (Excellent)	13,500*
6600 diesel, 1978 (Good)	5200
6600 diesel, 1975 (Good)	5700*
5000 diesel, 1970 (Good)	4300*
5000 diesel, 1968 (Fair)	3725
4600 diesel, 1976 (Good)	4100*
4000 diesel, 1974 (Excellent)	3950
4000 diesel, 1972 (Good)	4000*
4000 diesel, 1967 (Fair)	2700
4000 diesel, 1966 (Rough)	2100*
4000 diesel, 1966 (Rough)	1600*
4000 diesel, 1966 (Fair)	2600
3000 diesel, 1970 (Good)	2700*
3000 diesel, 1968 (Good)	2050
3000 diesel, 1966 (Good)	3000
3000 diesel, 1966 (Rough)	2250
3000 diesel, 1966 (Good)	3100*
2000 diesel, 1966 (Good)	2500*
Maj. diesel, 1953 (Rough)	300
641 diesel, 1961 (Good)	1500
641 diesel, 1961 (Good)	1875
Jub. 1953 (Fair)	1100*
8N, 1952 (Excellent)	1750
8N, 1952 (Excellent)	1750*
8N, 1950 (Good)	1300*
8N, 1948 (Fair)	775

INTERNATIONAL HARVESTER TRACTORS

1466 diesel, 1974 (Rough)	2950
1066 diesel, 1974 (Good)	5400*
674 diesel, 1974 (Good)	3250*
674 diesel, 1974 (Excellent)	4500
574 diesel, cab, 1976 (Good)	3300*
574 diesel, 1975 (Excellent)	4000*
454 diesel, 1971 (Good)	3600
444 diesel, 1970 (Good)	3100*
444 diesel, 1967 (Rough)	2300*
414 diesel, 1963 (Fair)	1000*
300, 1955 (Good)	1300
B275 diesel, 1959 (Excellent)	1800*
140, 1960 (Good)	1100*
Cub Loboy, 1966 (Good)	1500
Cub Loboy, mo., 1966 (Good)	1800

JOHN DEERE TRACTORS

4620 diesel, 1971 (Good)	4000
4240 diesel, 1979 (Excellent)	11,500*
4230 diesel, 1973 (Excellent)	10,000*
2840 diesel, 1978 (Excellent)	7300*
2240 diesel, 1977 (Good)	4700
2040 diesel, 1977 (Good)	4350
1520, 1970 (Rough)	800*
60, 1953 (Good)	1000*

LONG TRACTOR

610 diesel, (Good)	1800

WHITE TRACTORS

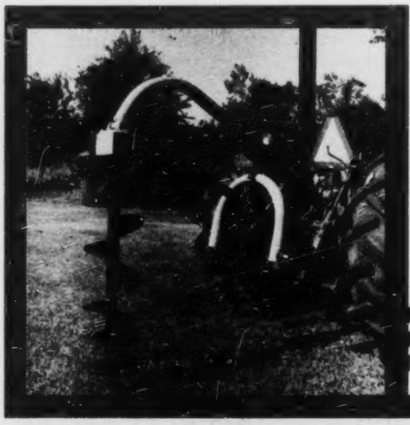
2-150 diesel, duals, 1975 (Fair)	3100
2-150 diesel, 1974 (Rough)	2000

YODER & FREY, INC.
Archbold, Ohio
July 9, 1985

INTERNATIONAL HARVESTER TRACTORS

Sup. C, 1952 (Fair)	850*
C, 1951 (Fair)	825
C, 1950 (Fair)	1050*
C, 1949 (Fair)	650*
A, 1947 (Rough)	750*
A, 1947 (Fair)	1150
Cub, 1950 (Fair)	1000*

(Continued on page 28)



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Auctions *(Continued from page 24)*

Cub, 1959 (Fair)	1400
154 Lo-Boy, (Fair)	1600
H, 1945 (Rough)	750*
H, 1950 (Fair)	700
H, 1946 (Fair)	450
M, 1950 (Fair)	800*
MD, 1950 (Rough)	900*
300, 1956 (Rough)	900*
70, 1974 (Fair)	3700*
400, 1956 (Rough)	600
454, 1971 (Fair)	2100*
460 diesel, 1959 (Fair)	1500
504 diesel, 1968 (Fair)	2700
560 diesel, 1962 (Fair)	1150*
574 diesel, 1975 (Rough)	2700
660, 1959 (Rough)	800*
656, 1970 (Good)	3500
350, 1956 (Rough)	825*
706, 1967 (Fair)	3200*
706, 1965 (Fair)	4350
756, 1969 (Fair)	2900*
806, 1963 (Fair)	2450
826, 1970 (Fair)	4750*
856 diesel, 1968 (Fair)	5750
966, 1973 (Good)	7250
1066, 1973 (Rough)	4500*
1206, 1966 (Rough)	3750*
BN, 1945 (Fair)	475
1466, 1975 (Fair)	6750
1586, 1978 (Good)	12,200*
1586, 1978 (Good)	11,500*
Sup. MTA, 1953 (Fair)	1500

OLIVER TRACTORS

77, 1953 (Fair)	500
77, 1955 (Fair)	575
77, 1955 (Fair)	450
77, 1954 (Rough)	900*
77, 1954 (Fair)	300
88, 1951 (Fair)	475
66, 1952 (Rough)	475
880, 1958 (Good)	1200
1850, 1966 (Rough)	2300*
1855, 1973 (Fair)	3100*
1955, 1972 (Good)	5250*

FERGUSON & MASSEY-FERGUSON TRACTORS

TO-20, 1946 (Fair)	1050
Ferg., 1947 (Fair)	925
Ferg., 1944 (Fair)	775
65,	1050
35 diesel, 1961 (Fair)	1100*
35 diesel, 1961 (Rough)	850
35 diesel, 1960 (Rough)	1100
50, 1959 (Rough)	1850
50, 1962 (Good)	1850*
50, 1959 (Rough)	1600*
50, 1963 (Fair)	1700
65, 1961 (Fair)	1550*
65, 1960 (Rough)	1600*
65 diesel, 1961 (Fair)	2250
85, 1960 (Fair)	1475
165 diesel, 1969 (Fair)	2800*
165,	2400
180 diesel, 1969 (Fair)	4500*
245 diesel, 1977 (Fair)	5500
1085, 1975 (Rough)	3950
1155, 1975 (Fair)	6000*
1155 diesel, 1977 (Fair)	4900*
240, (New)	6900*
250, (New)	8700*

JOHN DEERE TRACTORS

A, 1944 (Rough)	375
B,	210
MT, 1949 (Good)	900
720, 1957 (Fair)	1800*
730, 1958 (Fair)	2500*
1010, 1965 (Fair)	2000*
2010, 1962 (Rough)	1900*
2020 diesel, 1972 (Rough)	1700
2020, 1970 (Fair)	3200*
4010, 1963 (Fair)	1750
4010 diesel, 1963 (Fair)	2450
4020, 1971 (Excellent)	7500*
4020 diesel, 1965 (Fair)	3900*
4020, 1968 (Good)	6700*
4230,	7900
4240,	14,600
4430, 1976 (Good)	10,500*
4430, 1975 (Excellent)	9300
4430, 1976 (Good)	10,000*
4430,	7400
4440,	17,000
4620, 1972 (Rough)	3750*
5020, 1970 (Fair)	4450*
5020, 1971 (Rough)	3800*
7520, (Fair)	10,000*

FORD TRACTORS

8N, 1947 (Fair)	1175*
8N, 1948 (Fair)	1150*
8N, 1950 (Fair)	1400
8N, 1947 (Rough)	1100*
8N, 1952 (Fair)	1300
8N, 1948 (Rough)	1025*
8N, 1961 (Good)	1385
8N, 1950 (Rough)	1000
9N, 1949 (Rough)	850
9N, 1942 (Fair)	1075
600, 1957 (Rough)	1550*
800, 1958 (Rough)	1600*
900, 1959 (Rough)	1625
901, 1957 (Rough)	1150
5000 diesel, 1967 (Fair)	3800
5000 diesel, 1965 (Rough)	3450
6000 diesel, 1961 (Rough)	1400*
8600 diesel, 1975 (Fair)	5200*
8600 diesel, 1975 (Fair)	4800*
Jub., 1954 (Rough)	1550
Jub. F, 1954	1150*
9700, 1978 (Good)	11,000*
861, 1957 (Fair)	2050
871, 1957 (Fair)	1375
3000, 1965 (Fair)	2450*

ALLIS-CHALMERS TRACTORS

B, 1947 (Rough)	300*
C, 1949 (Rough)	400
WD-45, 1953 (Rough)	410*
WD-45 diesel, 1956 (Fair)	1225
200, 1971 (Rough)	3950
7000, 1976 (Good)	6750*
160 diesel, 1971 (Rough)	1800*

DAVID BROWN TRACTORS

1210 diesel, 1976 (Fair)	3100*
1200, 1969 (Rough)	2175

WHITE TRACTOR

2-105, 1975 (Good)	7450

CASE TRACTORS

530, 1965 (Fair)	2050
730, 1966 (Fair)	2000
830, 1964 (Fair)	1400*
830, 1965 (Rough)	1400*
930, 1962 (Rough)	700*
930 diesel, 1964 (Rough)	2150
930 diesel, 1967 (Fair)	2700
1070, 1972 (Fair)	5750
1270, 1972 (Fair)	6500
1470 TK,	4800
2390, 1980 (Fair)	12,500
2670,	8000

MASSEY-HARRIS TRACTOR

44, 1950 (Rough)	350

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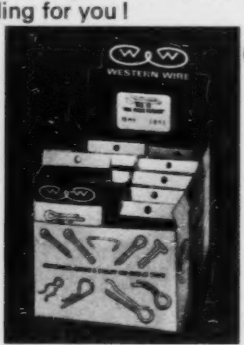

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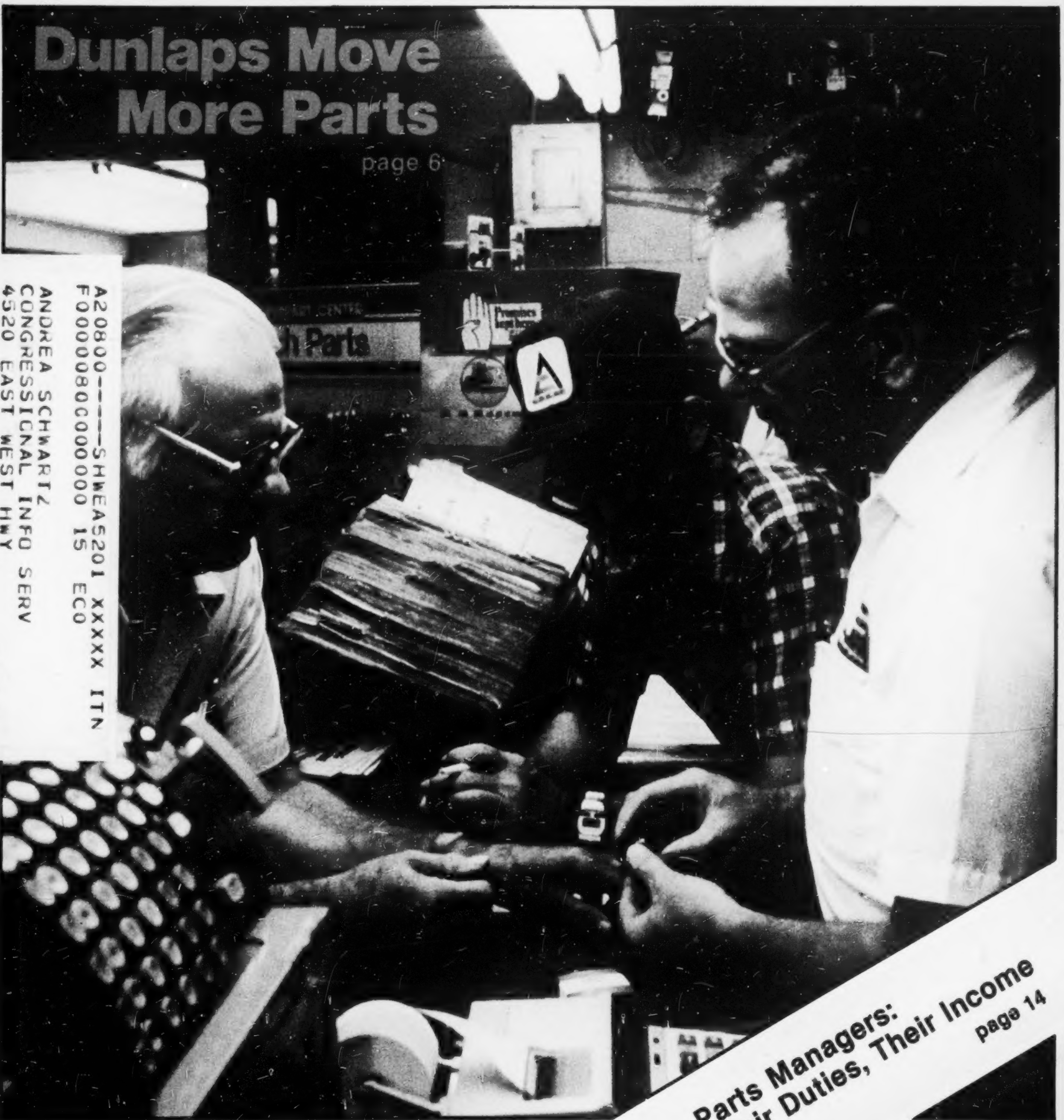
OCTOBER 1985



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Parts Managers: Their Duties, Their Income

page 14

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October 1985 • Vol. 100 • No. 12

86th ANNUAL
Welcome NATIONAL FARM & POWER EQUIPMENT
DEALERS ASSOCIATION

Jean and Bill Martin (far right), new president of NFPEDA, present their family at the annual convention. More on page 16.

6: They're Moving More Parts Now at Dunlap's. The basic strategy: Do what the mass merchandisers do, and do it better.

14: Parts Managers' Wages Revealed. The results of I&T's For Dealers Only survey that ran in the July 1985 issue asking, "All About Parts Managers."

16: New Structures Ahead for NFPEDA. At the 86th annual convention in Louisville, Ky., the board of directors approved a measure to establish divisions, recognizing the diversity of product and market in which members are involved.

20: An Upbeat Meeting for Kubota Dealers. Celebrating 25 years and a million tractors sold, Kubota cut dealers in on company planning at its second national dealer meeting in New Orleans.

24: Real Productivity Advancements—Or More Bells and Whistles? Frank Buckingham, I&T's ag engineering editor, asks, "Is there a cry for 'back to the basics' in farm equipment? Are today's designs worth the price to farmers?"

26: Tractor Fuel Economy Ratings. Continuing on from last month, here are more tractor fuel economy ratings under different load conditions, as recorded by the Nebraska Tractor Test Lab.

On the cover...helping a customer find the part he needs at Dunlap Implement Co., Poplar Bluff, Mo.

DEPARTMENTS

I&T Update 2
Editor's Notebook 4
For Dealers Only Survey 9
What's New 28
Auction Prices 29
New Literature 34
Industry in Motion 34
Classified Ads 37
Index to Advertisers 37
Brown Pages 38

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I&T Update

August Retail Sales: Hard Times Hang On

The August flash report of the Farm & Industrial Equipment Institute on U.S. retail sales of major items continued the general trends shown through most of the year. Sales were down in combines, balers, forage harvesters and mower conditioners and most types of large tractor. Small tractors continued their strong showing.

Unit Retail Sales

	August			January-August		
	1985	**1984**	**Pct. Change**	**1985**	**1984**	**Pct. Change**
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	4,269	3,547	+20.4	41,810	36,664	+14.0
40-99 hp	2,383	2,462	− 3.2	26,941	27,032	− .3
100-139 hp	335	399	−16.0	5,585	6,406	−12.8
Over 140 hp	640	873	−26.7	7,111	8,956	−20.6
Total 2-wheel drive	**7,627**	**7,281**	**+ 4.8**	**81,447**	**79,058**	**+ 3.0**
4-wheel drive						
Under 200 hp	42	63	−33.3	569	1,091	−47.8
Over 200 hp	133	88	+51.1	1,155	1,749	−34.0
Total 4-wheel drive	**175**	**151**	**+15.9**	**1,724**	**2,840**	**−39.3**
Total All Tractors	**7,802**	**7,432**	**+ 5.0**	**83,171**	**81,898**	**+ 1.6**
S-P Combines	861	958	−10.1	3,811	5,175	−26.4
Balers (under 200-lb. bales)	725	959	−24.4	5,736	6,703	−14.4
Forage Harvesters (shear-bar type)	257	333	−22.8	1,326	1,806	−26.7
Mower-Conditioners	991	1,136	−12.8	8,908	10,465	−14.9

MF Sales Steady, But Losses Posted

Massey-Ferguson posted a net loss of $5.9 million in the second period of 1985 (ended July 31) on sales of $372.5 million. For the year, net sales of $679 million were up about 1 per cent from the same six months of fiscal 1984.

For the year, MF had a net loss of $5.5 million, compared with net income in 1984 of $9.8 million.

The company experienced a loss of over $8 million by its Combines Div. and a one-time charge of $7.6 million for closing two unprofitable European plants, both in the second period.

Irv Aal's Back as Head of Steiger

Steiger Tractor, Inc., Fargo, N.D., has named Irvin E. Aal president and chief executive officer, succeeding David Koentopf, who left the company earlier this year.

Aal was president of International Harvester Co.'s Agricultural Equipment Group until its acquisition by J I Case Co. earlier this year. Previously, Aal was vice-president and general manager, North America, for Sperry New Holland.

Allied Ready To Acquire White Farm

Subject to court approval, Allied Products Corp. will take over White Farm Equipment Co., offering hope that the silver tractor line will be back in production late this year.

The purchase agreement was announced in mid-September. Few details were released, and the deal requires approval of both the federal court in Chicago that is processing White's Chapter 11 bankruptcy and the court-appointed creditor committee.

"This is a big step toward coming back, but there's still a lot to be done," commented Robert L. Terry, White's senior vice-president and general operating manager. "We still need a definitive agreement and resolution of a lot of details. There are five of us and five hundred things to do, but we've made the first big step."

Allied President Richard A. Drexler said, "We look upon White as a significant opportunity, and we intend to operate it as a going concern."

Allied's ag equipment division has owned Bush Hog and Continental Gin since the early 1970s, and bought Kewanee Farm Equipment in 1983 and New Idea Farm Equipment in 1984.

White would cost Allied more than $10 million in nonconvertible preferred stock.

The broad outline of the initial deal looks like this:

- All White U.S. products and operations would go to Allied, except the plant at South Bend, Ind. Field tools built there would move to other Allied-owned plants or be subcontracted.
- Tractor production could resume in November at Charles City, Iowa, pending agreement with suppliers. During this year's production shutdown, that plant was modernized to allow mixed-model production. Previously, single-model batches were built. The change will allow better response to market demand.
- Iseki of Japan built White's tractors between 30 and 75 pto horsepower. Allied would have to negotiate a new pact with Iseki.
- White dealers would be asked to sign new contracts with the company.
- The Canadian plant that built White combines is not included in the deal. Allied could negotiate for purchase of the plant, or perhaps just the products and tooling for White's conventional combines. Massey-Ferguson acquired the White axial-flow combine line in July.
- White's product line could grow with addition of hay tools, rotary cutters and other equipment coming from other Allied companies.

New EPA Rules Affect Dealers

Many tractor dealers will be classified as hazardous waste generators and will have to follow special federal rules for disposing of and transporting their trash, under new rules from the Environmental Protection Agency.

EPA says it considers a business a "small quantity generator" if, in any calendar month, it produces between 220 lbs. and 2,200 lbs. of certain waste materials considered hazardous. Such businesses must use a special Uniform Hazardous Waste Manifest form when shipping the waste off-site.

Many service department and reconditioning operations in dealerships would generate the kind of wastes that come under the new rules. Ignitable wastes, spent solvents, combustible solids and waste acid or alkaline liquids are on the list, and these are generated by oil, grease and rust removal, engine and parts cleaning, paint preparations and painting.

Used lead acid batteries, a common scrap item at equipment dealerships, are also on the list. It would take only three or four large batteries a month to make the 220 lb. weight limit.

But the EPA points out that if those batteries are destined to be recycled, then the special shipping manifest does not

(Continued on page 43)

Now THAT'S Incentive!

A brief look at how some dealerships use incentives to move parts and motivate their managers.

Parts Annual Sales	Manager Base Wage	Manager Incentive	Total Compensation
$1,250,000	$18,000	$15,000	$33,000
1,200,000	13,000	12,000	25,000
860,000	17,680	7,960	25,640
675,000	18,000	11,000	29,000
595,360	22,000	8,000	30,000
572,709	17,340	8,829	26,169
345,000	18,000	6,000	24,000

FDO Survey Report

Parts Manager Wages Revealed

■WOULD you answer this help-wanted ad?:

> **Department manager.** Responsible for $500,000 annual sales at 30 per cent gross margin. Supervise two employees, control purchasing, advertising, etc. Must be good with customers. Requires 14 years in the business, including 10 as manager. Annual compensation, $20,408.

Before sending in your resume, consider that the average new college graduate started a job in 1985 at $20,470, according to Michigan State University's *Recruiting Trends*. That report showed business administration graduates averaging $17,782 in their new careers. Would a person with 10 years of management experience accept the wage being offered in that help-wanted ad?

Apparently a lot of people do, and they're called parts managers.

The job described above is based on the 40 responses I&T received to the **For Dealers Only** survey that ran in the July 1985 issue, asking "All About Parts Managers."

Twenty-three of the 36 dealers who reported on wages indicated they have some kind of incentive for the parts managers, but the group cited in the table were offering some serious cash for productivity, and all but the last were clustered above the mid-point in sales volume.

Which comes first?

Do the dealerships sell a lot of parts because they offer good incentives, or do they offer the incentives because they sell a lot of parts?

For interpretation, we showed the survey results to John R. Walker, president of After Market Services Consulting Co., the firm used by many major manufacturers, including farm equipment, in dealer parts-training programs.

As expected, the best wages went to managers at the biggest operations. The top dealer grossed $1,250,000 in annual parts sales and paid the manager $33,000, while the smallest dealership among 36 that reported both figures had gross sales of $125,000 and paid $13,000 to the manager.

Plotting the percentage of sales dollars that went to the manager's compensation against annual parts sales produced a strong trend line that shows the benefits to the total profit picture of having a large parts sales figure.

Obviously, bigger operations need more people and facilities to handle the bigger sales volume—but the extra potential profit of about 7 per cent can hire a lot of people and install a lot of shelving.

It appeared that the dealerships with the biggest parts volume were also the ones that gave the richest incentives to the parts managers. The wage and incentive picture at some of the top volume (and top compensation) dealers is shown in the accompanying table.

"It's just human nature that a good incentive program motivates a manager to sell more parts," Walker said. "It happens just about every time a dealer spends some time thinking about the parts department and adopting a program to make that the profit-making department it should be.

"But you can't just look at sheer volume," Walker cautions. "You've got to look at the obsolete parts on the shelves, and the ratio of parts ordered as stock versus those ordered on an emergency basis. Obsolete parts and emergency orders can kill your profits, and that's where management skill comes in."

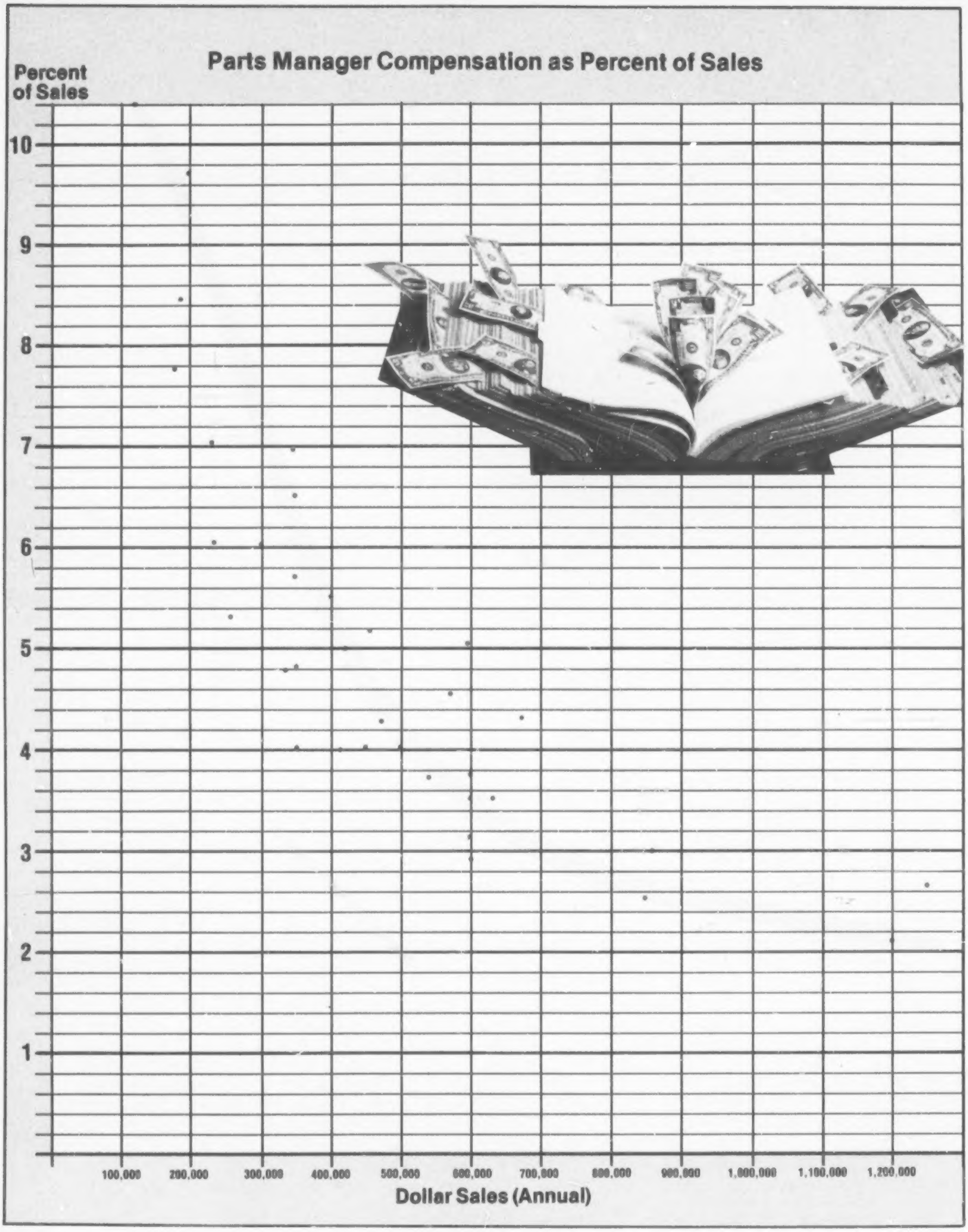
The survey didn't look into management practices that deeply, but did find that, on average, the parts managers spent 3.78 days in

Got a minute?

If you find the information in the FDO survey report useful, informative or just mildly amusing, then spend a minute or two making it even better.

On page 9 of this issue is the **For Dealers Only** survey form, printed on card stock. This month's survey concerns service managers, and follows the same format as used for parts managers in this month's report.

It doesn't cost you a dime, just some time! The survey form is perforated, so it tears out easily, and the card is a pre-paid mailer, so no postage is needed. Thanks for your time!



Parts Manager Compensation as Percent of Sales

training last year, with 34 of 40 having spent at least one day in training in the last 12 months.

Job descriptions

The survey indicated that the top-dollar group of dealerships did concentrate on inventory management. Among the top 13, with sales of $600,000 and up, 11 of 13 dealers said inventory management is the top job priority of the parts manager. By contrast, inventory management was top priority for only 9 of the lower 27.

Of the 27 dealers below $600,000, 16 said that the most important job of the parts manager was "dealing with customers in person."

For the top 13, dealing with

(Continued on page 27)

Parts Manager Wages

(Continued from page 15)

customers was generally the third or fourth priority in job duties. Ordering parts was the second most important function listed for seven of the top 13 managers—and ordering parts is certainly a segment of inventory control. Another five of the top 13 gave "supervising employees" as the second most important task. One member of the top group rated "merchandising/promoting parts sales" as the second most important function.

The monthly FDO survey is rather informal, and the results can't be taken as gospel...but the findings above do show some differences in the way parts managers spend their time and earn their wages at different-sized dealerships.

On one score the two groups seem fairly similar: For five of the top 13 and 14 of the lower 27 managers, the thing they do best is "dealing with customers in person."

The size of the dealership apparently makes for some changes in the nature of the job, as shown by the additional duties given to some parts managers.

Among smaller-sized dealerships, the survey found one parts manager who takes service calls during the harvest season, and another who schedules shop work. At a dealership with $240,000 in parts sales, the parts manager also sells lawn mowers. Another parts manager supervises used tractor reconditioning and salvaging parts from used tractors.

One dealer helped redefine the traditional term "partsman" by noting, "parts manager is female. Best we've had in 34 years."

And finally, there was one small dealership at which the boss commented, "Due to economic conditions, our service manager, ADP inventory pad and I split the duties of parts manager!" I&T

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Plus visible reliable switches.

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Air Cleaner
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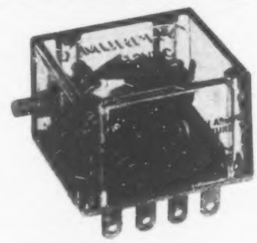
Jacket Temp. SWICHGAGE®



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I&T
SINCE 1886

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

JONES FARM EQUIPMENT CO.
Dothan, Alabama
August 13, 1985

ALLIS-CHALMERS TRACTOR

175 diesel, 1975 (Good)	3800

CASE TRACTORS

1370 diesel, 1973 (Good)	9000
446 diesel, har., cult., plt., plow (Fair)	1675

DEUTZ TRACTOR

3006 diesel, 1973 (Fair)	1775*

MASSEY-FERGUSON TRACTORS

1105 diesel, 1973 (Good)	4100*
1085 diesel, 1976 (Fair)	2600*
245 diesel, 1975 (Good)	4375*
235 diesel, 1975 (Good)	3000
175 diesel, 1973 (Good)	3400
175 diesel, 1971 (Good)	3350
175 diesel, 1970 (Fair)	3000
175 diesel, 1969 (Good)	3650
165 diesel, 1968 (Good)	2800*
135 diesel, 1973 (Fair)	2400
135 diesel, 1971 (Rough)	1875*
135 diesel, 1967 (Good)	3150*
135 diesel, 1967 (Good)	3350*
135 diesel, 1966 (Rough)	2000
135 diesel, 1966 (Fair)	2600*
130 diesel, 1969 (Fair)	1900
65, diesel, 1959 (Rough)	750
35, 1963 (Excellent)	2650
35, 1962 (Good)	1600*
35, 1958 (Rough)	600
35, 1956 (Good)	1950
TO30, 1952 (Good)	1200
TO20, 1949 (Rough)	650*

FORD-FERGUSON TRACTORS

9N, 1941 (Rough)	585
9N, 1940 (Excellent)	1400*

FORD TRACTORS

8000 diesel, 1972 (Good)	5500
6610 diesel, 1985 (Excellent)	14,000
6600 diesel, 1975 (Good)	4500*
6600 diesel, 1975 (Good)	4000*
5000 diesel, 1970 (Fair)	4000*
5000 diesel, 1967 (Rough)	2100
5000 diesel, 1967 (Rough)	2200*
4600 diesel, 1975 (Fair)	3600
4600 diesel, 1975 (Good)	4200*
4110 diesel, 1968 (Fair)	2300
4000 diesel, 1968 (Fair)	3000
4000 diesel, 1968 (Fair)	2900
4000 diesel, 1967 (Fair)	2700
4000 diesel, 1966 (Rough)	2200*
4000 diesel, 1963 (Rough)	1400*
3600 diesel, 1968 (Good)	3600
3600 diesel, 1966 (Good)	3600*
3000 diesel, 1972 (Excellent)	3700*
3000 diesel, 1969 (Good)	3100
3000 diesel, 1969 (Good)	3000
3000 diesel, 1968 (Good)	3000*
3000 diesel, 1968 (Good)	3000*
3000 diesel, 1967 (Fair)	2500*
3000 diesel, 1967 (Fair)	2600
2000 diesel, 1966 (Good)	2425*
2000 diesel, Select-O-Speed, 1966 (Rough)	1100*
850, 1957 (Excellent)	2650
841 diesel, 1959 (Fair)	1300
841 diesel, 1959 (Fair)	1450
641, 1959 (Good)	1700*
Dexta, 1959 (Good)	1750
Jub., 1953 (Fair)	1000
8N, 1951 (Good)	1350*
8N, 1949 (Fair)	825*
8N, 1948 (Good)	1650
8N, 1948 (Fair)	800*

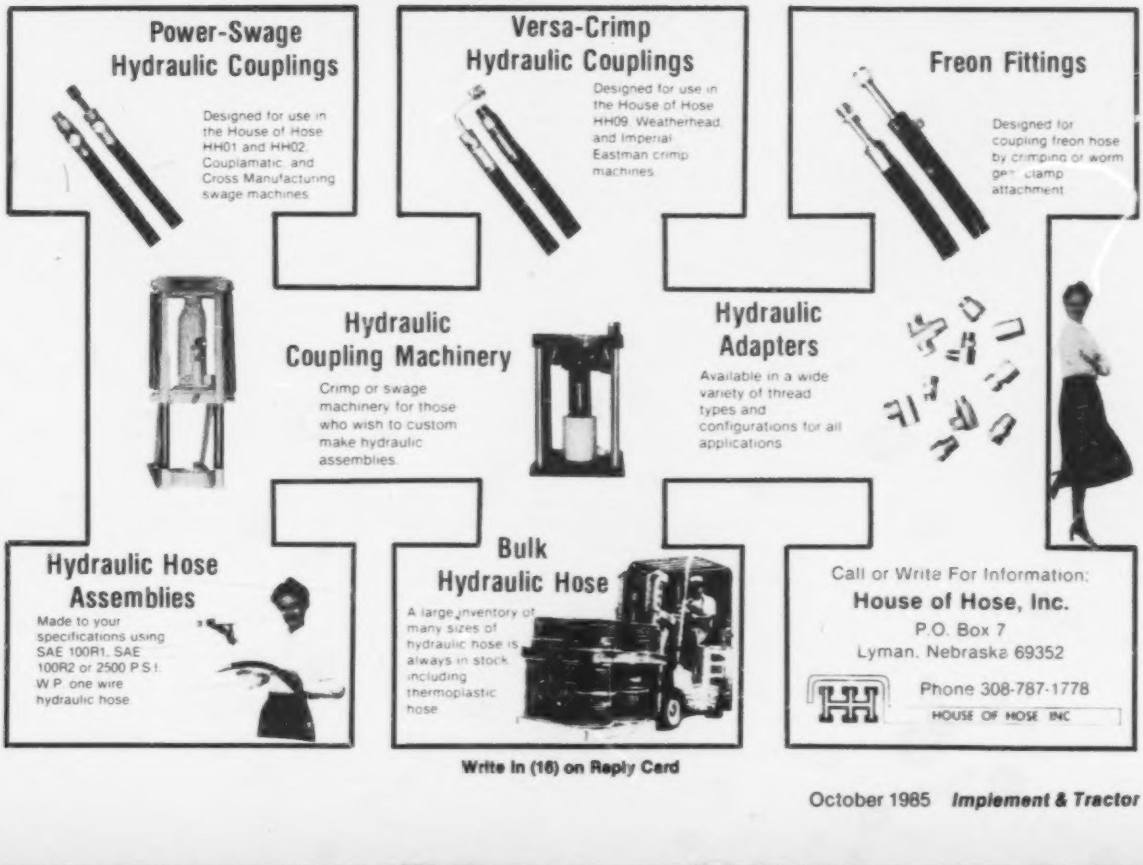
INTERNATIONAL HARVESTER TRACTORS

1586 diesel, cab, duals, 1976 (Good)	6100*
1466 diesel, 1972 (Rough)	3000
784 diesel, cab, 1980 (Excellent)	6500*
684 diesel, 1980 (Good)	5550
674 diesel, 1977 (Rough)	1950*
674 diesel, 1976 (Good)	3025
574 diesel, cab, 1976 (Excellent)	3800
574 diesel, 1975 (Excellent)	4100
574 diesel, 1975 (Good)	3050
454 diesel, 1972 (Good)	3850
454 diesel, 1971 (Fair)	2800*
454 diesel, 1971 (Good)	3450
444 diesel, 1970 (Good)	2900*
444 diesel, 1968 (Rough)	1500*
B414 diesel, 1963 (Fair)	975
B414 diesel, 1963 (Good)	2300*
300, 1955 (Good)	1000*
B275 diesel, 1960 (Good)	1350
140, 1966 (Good)	1100
100 diesel, hydro, 1975 (Good)	3300

JOHN DEERE TRACTORS

4440 diesel, cab, 1978 (Excellent)	16,000*
4240 diesel, cab, 1979 (Excellent)	12,000*
4020 diesel, 1966 (Rough)	2750*
3020 diesel, 1965 (Good)	3700*
2840 diesel, 1978 (Good)	6500
2240 diesel, 1980 (Excellent)	5850*
2130 diesel, cab, (Good)	6000*
2130 diesel, cab, (Good)	6500*
2040 diesel, 1979 (Good)	4850

(More...)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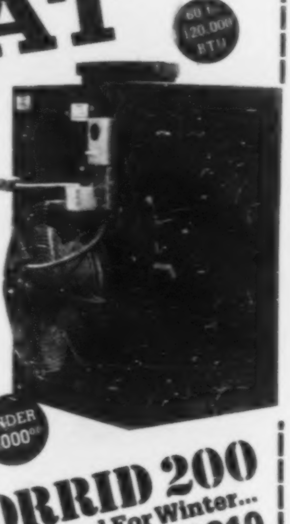

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Ideal For: Service stations, auto repair and transmission shops, farm implement stores, barns, farrowing houses...anywhere waste oil is available and heat is needed!

U.L. Approved Controls. Unit Now in Use in Hundreds of Shops, Coast to Coast!

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Call 816-525-3810
Write To: 615 N. Independence,
Lee's Summit, Mo. 64063

TORRID-200 Pays For Itself In ONE Winter Season!

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Auctions

(continued)

2030 diesel, 1974 (Good)	4200
2010, 1961 (Fair)	700
1120 diesel, (Good)	3700*
1020 diesel, sprayer, 1971 (Fair)	2100*
60, 1953 (Rough)	350
MT, 1949 (Good)	500

OLIVER TRACTORS

1655 diesel, 1971 (Fair)	1900
1465 diesel, 1975 (Good)	3100*

YODER & FREY, INC.
Archbold, Ohio
August 13, 1985

INTERNATIONAL HARVESTER TRACTORS

Sup. C, 1951 (Fair)	600*
Sup. C, 1953 (Good)	850
C, 1950 (Fair)	600
A, 1950 (Fair)	700
Cub, 1955 (Fair)	1000*
Cub, 1950 (Fair)	800*
H, 1951 (Fair)	325*
H, 1950 (Rough)	180
H, 1945 (Fair)	450*
M, 1952 (Rough)	975*
M, 1950 (Fair)	780*
Sup. M, 1952 (Good)	950
230, 1957 (Good)	1725
274, 1975 (Fair)	3750*
400 diesel, 1957 (Rough)	600*
460, (Good)	1000*
2504, 1966 (Rough)	1450*
560, 1961 (Rough)	850
560, 1959 (Rough)	1250*
560, 1961 (Good)	2100*
560 diesel, 1960 (Fair)	1400*
560, 1961 (Fair)	1400*
660 diesel, 1960 (Fair)	880*
686 diesel, 1978 (Good)	9650
706, 1966 (Fair)	1200*
706 diesel, 1963 (Rough)	2100*
706, 1967 (Good)	3900
706 diesel, 1964 (Good)	3000
706 diesel, 1965 (Rough)	920
766 diesel, 1974 (Fair)	6500*
766, 1973 (Fair)	1500
766, 1974 (Good)	7300*
806 diesel, 1965 (Fair)	4000*
826, 1970 (Fair)	4000*
856 diesel, 1970 (Fair)	5200*
856 diesel, 1970 (Good)	4650
966 diesel, 1972 (Good)	6400
966 diesel, 1973 (Good)	6600*
1066 diesel, 1974 (Good)	6500*
1066 diesel, 1974 (Good)	5800*
1066 diesel, 1972 (Good)	5200
1066 diesel, 1974 (Good)	6220
1206 diesel, 1963 (Rough)	3000*
1466 diesel, 1975 (Fair)	5500*
1486 diesel, 1977 (Good)	13,000*

MASSEY-HARRIS TRACTOR

44, 1949 (Rough)	325

DAVID BROWN TRACTOR

1200, 1976 (Fair)	2700

COCKSHUTT TRACTOR

1655, 1972 (Fair)	2800

ALLIS-CHALMERS TRACTORS

WD, 1948 (Fair)	450*
WD, 1946 (Rough)	400*
WD, 1947 (Fair)	370
WD-45, 1953 (Rough)	460
WD-45, 1955 (Fair)	1200
WD-45, 1956 (Fair)	950
D-17, 1964 (Fair)	1150*
D-17, 1964 (Good)	1375
7000, 1975 (Fair)	5200

CASE TRACTORS

770, 1971 (Rough)	2450
830, 1965 (Rough)	1100*
930 LP, 1965 (Rough)	900*
995, 1974 (Rough)	2450*
1030 diesel, 1964 (Rough)	1700*
2390 diesel, 1981 (Fair)	12,500*

MASSEY-FERGUSON TRACTORS

35 diesel, 1959 (Fair)	1150*
35, 1960 (Rough)	1600*
50, 1959 (Rough)	1300*
50, 1959 (Fair)	1600*
50, 1959 (Fair)	1500
175 diesel, 1971 (Fair)	2700
180 diesel, 1971 (Fair)	3900*
575 diesel, 1978 (Good)	6100

MINNEAPOLIS-MOLINE TRACTOR

G-1000, 1971 (Rough)	2250

OLIVER TRACTORS

77, mo., 1951 (Fair)	880
77, mo., 1949 (Rough)	925
77, 1951 (Fair)	350
77, 1953 (Fair)	475
880 diesel, 1961 (Rough)	750*
1265, ldr., (Rough)	1500*
1650, 1966 (Fair)	2300*
1800, 1962 (Rough)	1900*
1850 diesel, 1967 (Fair)	2000*
1855 diesel, 1972 (Good)	4800*
1855 diesel, 1972 (Good)	4050*
1955 diesel, 1973 (Good)	4500*

JOHN DEERE TRACTORS

B, 1944 (Fair)	275
B, 1946 (Fair)	625
MT, 1948 (Fair)	475*
70, 1955 (Good)	1200
80, 1957 (Fair)	1500*
420, 1958 (Rough)	1900*
2640 diesel, 1981 (Good)	8700
2840, 1981 (Good)	10,500
3020, 1965 (Rough)	2600*
3020, 1966 (Rough)	2400*
4010 diesel, 1963 (Fair)	3950
4010 diesel, 1963 (Fair)	2100*
4010 diesel, 1964 (Fair)	3100*
4010 diesel, 1962 (Good)	3500*
4010, 1962 (Good)	3500*
4020 diesel, 1966 (Fair)	3900*
4020 diesel, 1970 (Good)	6000
4020, 1965 (Good)	5375
4020, 1967 (Fair)	3600*
4020 diesel, 1967 (Good)	5300*
4230 diesel, 1975 (Good)	9500*
4320 diesel, 1971 (Good)	7400*
4320 diesel, 1972 (Good)	9000*
4520 diesel, 1969 (Fair)	5100*
5020 diesel, 1970 (Rough)	3500*
5020 diesel, 1970 (Rough)	1400*
5020 diesel, 1970 (Fair)	3100*
7520 diesel, 1970 (Rough)	9500*

FORD TRACTORS

8N, 1952 (Rough)	1100*
8N, 1947 (Fair)	1275*
8N, 1948 (Rough)	750*
8N, 1947 (Rough)	475
9N, 1942 (Fair)	1350*
9N, 1942 (Rough)	420
860, 1958 (Rough)	2000*
860, 1962 (Fair)	1300*
871, 1957 (Fair)	1200
3000 diesel, 1968 (Fair)	2800*
5000, 1970 (Good)	5350
5000 diesel, 1965 (Rough)	2500*
5000 diesel, 1964 (Fair)	3300*
5000 diesel, 1965 (Fair)	4675
7000, 1968 (Rough)	4200
8000 diesel, 1972 (Fair)	4000*
9600 diesel, 1975 (Fair)	4600*
Jub., 1954 (Rough)	1400*

WHITE TRACTORS

2-60, (Rough)	3300
2-105 diesel, 1976 (Good)	5000*
2-135 diesel, 1976 (Good)	9500*
4-150 diesel, 1974 (Fair)	7750*
1470, (Fair)	2600